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JOURNAL

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VOLUME XIII.

# A DESCRIPTION OF THE CODEX WITSENII IN THE SOUTH AFRICAN MUSEUM.

(With Plates I--XII).

By K. H. Barnard, D.Sc., F.L.S., South African Museum.

The first mention in print of the existence in Cape Town of two MS. volumes of paintings dealing with Simon van der Stel's Namaqualand expedition seems to have been made by Strangman. He does not describe either the Museum or the Public Library volume, beyond saying that the paintings in the latter are of "far finer quality and finish," and that the natural history notes are very similar in both but without dates in the latter.*

In 1924 Prof. G. Waterhouse gave a preliminary account of a MS. Journal and a series of coloured drawings describing Simon van der Stel's journey to Namaqualand. In 1932 he published a fuller account in book form, reproducing the pictures in monochrome, the Dutch text of the Journal and of the natural history notes, together with an English translation.†

In both accounts Waterhouse mentions the existence of a volume of

* E. Strangman. "On the identity of Claudius." Cape Times, 9th April, 1921. Cape Town. The title is to some extent a misnomer.

† G. Waterhouse. Geogr. Journ. R.G.S. vol. lxiv. No. 4, Oct., 1924.
Idem. Simon van der Stel's Journal of his Expedition to Namaqualand 1685-6. Longmans, Green & Co., 1932.

similar drawings in the South African Museum, and in his book he gives some details of the series. This Museum volume had been temporarily deposited in the Archives, Cape Town in 1924. No application was received by the Museum for information concerning the volume, and the details printed by Waterhouse were derived from Col. C. Graham Botha, then Chief Archivist. One or two (very minor) errors in transcription, however, have crept into Waterhouse's account. Moreover, the South African Museum, being familiar with the local fauna, might possibly have helped him in the identification of the animals in some instances to better purpose than the Natural History Museum, London. In mitigation, however, be it said that apparently Waterhouse submitted only *monochrome* photographs of the pictures (1932, p. 172) *without the accompanying notes*, which was not altogether fair to the Natural History Museum.*

In the following description of the South African Museum volume the original Dutch text of the natural history notes is reproduced in full, and all the pictures. Comparison can thus be made with the Trinity College, Dublin (T.C.D.) text, which Waterhouse was not in a position to do. There is also the series in the South African Public Library, Cape Town (S.A.P.L.), and from these three sources 91 different picture-folios are known. The two panoramas and all the botanical pictures are represented in S.A.M., which lacks only 13 of the others (1 Namaqua, 12 zoological) and can therefore be regarded as the most complete series.†

Moreover, particular interest attaches to the S.A.M. volume because (1) it contains an inscription written and signed by Nicolaas Witsen

* E.g. T.C.D. 747 was identified as a Pied Barbet. The corresponding picture in the South African Public Library volume, No. Z.7 (see p. 9 infra), is the common brown and yellow Cape Canary. The Dutch text "fluyt seer liefflyck" would apply to the latter bird, but not to the former. See also note on fol. 136. p. 44.

† Waterhouse mentioned two other collections of drawings, but not the following :—

Catal. Libr. Brit. Mus. (Nat. Hist.) vol. iv. p. 1558, 1913.

> "73 rough water-colour drawings of Plants made at the Cape, from living specimens, for Dr. Martin Dolneus, and given [*sic.* Petiver says purchased] by him to J. Petiver. 67 of these were used by Petiver in the preparation of the plates for his '*Gazophylacii Naturae . . . . . decas nona*', and bear the reference to those plates in his handwriting. Banksian MS. No. 88. *Vide* Dryander's 'Cat. Bibl. Banks' vol. iii. p. 178. Cf. also the author's '*Gazophylacii Naturae . . . . . decas nona*, explanation to Plate xc. fig. 9."

Petiver in the caption to first page of '*Decas Nona seu Herbarium Capense*' of his *Gazophylacii Naturae* says :—

> "This Decade contains the Figures of One Hundred Elegant Plants, all growing about the Cape of Good Hope. And Copied from the Original Paintings taken from the living Plants, viz. : Those which the States of Amsterdam presented to the Right Reverend the Bishop of London, when His Lordship was at the Congress there A.D. 1691, with above Fifty other Painted from Growing Plants. Lately Purchased from the Cape."

saying the work was made for him at the Cape in 1692.* This fact was overlooked by Strangman.

(2) It was in the possession of Johannes Burman,† who copied some of the botanical pictures to illustrate his descriptions of Cape plants, and was referred to by him as one of the " three codices of the illustrious Burgomaster Witsen " (Burman, p. vi).

(3) Its history is documented, with the exception of two periods: Waterhouse has attempted to show how this Codex came into Burman's possession; but nothing is known of its history between 1800, when Burman's library was sold, and 1829 when Sir J. A. Truter presented it to the South African Literary Society.§

I have not compared the text of all the notes accompanying the pictures in S.A.P.L.; these are written on alternate folios as in T.C.D., not on the reverses of the picture-folios, and some of the pictures have no accompanying notes. But a brief comparison shows that they are verbally very like those in S.A.M. (cf. fol. 63 (53) *infra*). They are written in Gothic script, but in a different hand from that of the zoological notes in S.A.M. They give the native names, but *not the dates* when the plants and animals were found.

These so-called Claudius drawings (T.C.D., S.A.M., S.A.P.L., etc.) are mainly of historical interest. Many have been copied in certain classical pre-Linnean works, but from a taxonomic point of view they are not picto-types. Botanists and zoologists would not be inconvenienced if neither the S.A.M. volume nor any of the other series had survived. As they *have* survived, it is useful to put on record exactly what pictures are in the S.A.M. volume, as Waterhouse has done for T.C.D.

* Nicolaas Witsen, 1641-1717. Several times Burgomaster of Amsterdam between 1682 and 1705. Portrait in Winkler Prins, Algemene Encyclopaedie, 1938.

† Johannes Burman, 1706-1779. *Decades Rariorum Africanarum Plantarum ad vivum delineatarum.* Dec. I-IV, 1738. Dec. V-X, 1739. Amsterdam.

Nicolaus Laurentius Burman, 1734-1793.

N. L. Burman, filius, 1782-1826.

See: M. C. Karsten, Journ. S. Afr. Bot. v. 1939, where a portrait of N. L. Burman, pater, is reproduced. Karsten gives dates of birth of J. Burman as 1707 and of N. L. Burman as 1733 (Waterhouse also gives 1707). Winkler Prins, Algemeene Encyclopaedie, 1938, confirms the dates 1706 and 1734 which are given in Catal. Libr. Brit. Mus. (Nat. Hist.), vol. i. 1903.

§ Johannes Andreas Truter, 1763-1845. Studied at Leyden, 1783-1787. Fiskaal at the Cape 1809-1812. Chief Justice 1812-1828. See: Van Riebeeck Society Publicat. No. 24, 1943. Editor's note 14 on p. 107.

S.A. Literary Society founded 1824. But " . . . . owing to some local impediments at the time . . . . its regular and legal existence was reserved for the year 1829 . . . . " In 1832 it became the S.A. Literary and Scientific Institution, and continued until 1855. See: L. Crawford, Trans. Roy. Soc. S. Afr. xxii, pt. 4, p. 313, 1934.

Waterhouse (1924, p. 300 and 1932, p. xii.) mentions de Mist's statement that the original van der Stel Journal with 72 drawings had disappeared from the Archives of the Dutch East India Company in Holland. C. Graham Botha had previously stated in the foreword to a lecture that "These must have been returned, for both the Journal and 72 drawings are to-day in the Hague Archives (Ref. K.A. 3999 for 1686)." Col. Botha has asked me to correct this statement which was due to his being misinformed.*

My thanks are due to Mr. D. H. Varley, Librarian of the South African Public Library, Cape Town, for permitting me to examine the series of drawings in his charge, and collate them with those in S.A.M. They are done on paper which is whiter, and seems of better quality than that in S.A.M.

The S.A.M. pictures are, mostly, rather crude. Many of them, however, compare favourably with T.C.D. as regards draughtmanship; as regards colouring a comparison is not yet possible. Only when one compares S.A.M. with S.A.P.L. does one realise how crude the former really are, both as regards draughtmanship and especially colouring. E.g. in S.A.P.L. No. B 17 the flowers are a beautiful crimson; in the corresponding S.A.M. fol. 49 they are brown daubs. A comparison of the draughtmanship of S.A.M. 75, T.C.D. 787, and S.A.P.L. B 27 is interesting (see p. 32 infra). It is questionable whether any of the S.A.M. pictures are the work of Claudius himself.

I am indebted to Mr. S. Garside for several interesting and informative talks about these pictures, and especially for lending me his copy of Tachard and photostats of rare botanical illustrations in his library. Also to the Trustees of the National Botanic Gardens for undertaking the publication of this commentary.

Prof. R. H. Compton (National Botanic Gardens), Mr. N. S. Pillans and Miss F. M. Leighton (Bolus Herbarium, University of Cape Town)

* C. Graham Botha. "Some Early Exploring Expeditions and Travels in South Africa." A lecture delivered on 31st March, 1916 at the Quarterly Meeting of the Mountain Club, Cape Town, (with foreword, privately printed; without foreword, Annual of the Mountain Club of South Africa, No. 20, p. 45, with map, 1917).

The statement (Annual p. 54, Reprint p. 4), that van der Stel crossed over Piquenier's Kloof (Grey's Pass) to the Olifants River is also incorrect. At the northern end of Piquetberg the expedition turned through St. Martin's Kloof (Het Kruis) and then northwards, passing Heerenlogement, and crossing the Olifants R. at the Compagnies Drift just below the junction of the Doorn R. See: the Journal as reproduced by Waterhouse; also Journal of Olaf Bergh., Van Riebeeck Society Publicat. No. 12, Ed. E. E. Mossop, Cape Town, 1931. 1st Journey, footnotes 11, 14, 17, 19, and Appendix A, and map.

have added the modern scientific names of the plants in the concordance (pp. 10, 11). Being field botanists, they are familiar with the local flora, and it is not surprising that in some cases the identifications differ from those given in Waterhouse.

## Description of the Volume.

Waterhouse (1932, p. xxi.) has given a general description of the S.A.M. volume, which may be supplemented by the following details. The binding appears to be original. The back has 9 gilt-ornamented panels. The front cover near the top has a large Capital Q and a full-stop, in faded ink. There are also in the middle of this cover indications of two initials which have been erased; only faint traces of the ink stain can be seen, and the letters are illegible (they may possibly have been N.B.). The significance of the Q is at present unknown.

The size of the paper (sheets with unworn edges) is $12\frac{3}{10}$ x $7\frac{4}{5}$ inches.

The various watermarks, only one of which and its countermark is mentioned by Waterhouse in connection with the S.A.M. volume (1932, p. xxi.), occur as follows :—

1. Fool's Cap (Heawood, fig. 121.*) 25mm. wire bars : fols. 1, 2, 162 i.e. 1st cover page (blank), 2nd cover page, and penultimate cover page (blank).

2. Arms of Amsterdam, with mantling, H. G. in block capitals below shield (cf. Heawood, fig. 164.), 25mm. wire bars : fol. 3 (panorama), fol. 6 (blank), fols. 9, 10, 11 etc., to 124, and fols. 128-161, interleaved with countermark 2a.

2a. Countermark P B in block capitals, 25mm. wire bars : fols. 4 and 5, 7, 8, 12 etc., interleaved with 2.

3. Arms of Amsterdam, with mantling, no initials, 25mm. wire bars : fol. 125 and fol. 163 (last cover page, blank).

3a. Countermark G T in block capitals, 25mm. wire bars : fol. 126.

4. Countermark CDG (Heawood in Waterhouse, 1924, p. 312, and 1932, p. xiv. footnote 19.) : fol. 127, blank.

* Heawood. Geogr. Journ. R.G.S. vol. lxiii, No. 5, May 1924, p. 391, 2 pls.

The sequence of the folios as bound is as follows :—

| Folios as bound. | Original numbers. | Subject. | Remarks. |
|---|---|---|---|
| 1 | — | (Blank) | B's historical note pasted on. S.A. Museum library press mark. Watermark No. 1. |
| 2 | — | Inscriptions by | Witsen, Truter, Layard. Watermark No. 1. |
| 3 | (corner torn) | Panorama | Explanatory notes on reverse. Watermark No. 2. |
| 4 | — | Notes continued | Countermark No. 2*a*. |
| 5 | 5 | Panorama | Explanatory notes below picture. Countermark No. 2*a*. |
| 6 | — | (Blank) | Watermark No. 2. |
| 7 | 7 | Botanical | 1st botanical picture. Countermark No. 2*a*. |
| 8 | — | (Blank) | Countermark No. 2*a*. |
| 9 | 9 | Botanical | Watermark No. 2. |
| 10 | — | (Blank) | |
| 11 | 11 | Botanical | |
| 12 | — | (Blank) | |
| | (This sequence continues : on the reverses ; interleaved folios blank and un-numbered). | | pictures on odd-numbered folios, with notes |
| 45 | 45 | Botanical | 20th botanical picture. |
| 46 | — | (Blank) | |
| 47 | 44 | Botanical | This folio and its blank misplaced by binder, or wrongly numbered after binding. Henceforth the picture-folios are serially numbered, the blanks ignored. |
| 48 | — | (Blank) | |
| 49 | 46 | Botanical | |
| 50 | — | (Blank) | |
| 51 | 47 | Botanical | |
| 52 | — | (Blank) | |
| | (This sequence continues). | | |
| 123 | 83 | Botanical | 59th botanical picture. Last original folio number. |
| 124 | — | (Blank) | |
| 125 | — | (Blank) | Watermark No. 3. |
| 126 | — | (Blank) | Countermark No. 3*a*. |
| 127 | — | (Blank) | Countermark No. 4. |
| 128 | — | Zoological | 1st zoological picture. None of these folios were originally numbered. |
| 129 | — | (Blank) | |
| 130 | — | Zoological | |
| 131 | — | (Blank) | |
| 132 | — | Zoological | 3rd zoological picture. The notes on reverse of this and all the following are written in Gothic script. (Plate XII, Fol. 160, reverse). |
| 133 | — | (Blank) | |
| | (This sequence continues). | | |
| 160 | — | Zoological | 17th zoological picture. |
| 161 | — | (Blank) | |
| 162 | — | (Blank) | Watermark No. 1. |
| 163 | — | (Blank) | Watermark No. 3. |

Two folios of panoramas, 59 folios of plants (only one picture on each folio), 17 folios of animals (27 pictures).

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Concordance of the folios in S.A.M. with those in T.C.D. and S.A.P.L., and with the illustrations reproduced in Burman(B) and Tachard(T). As the folios in S.A.P.L. are not numbered, the pictures are referred to here as B 1, 2, etc. (Botany) and Z 1, 2, etc. (Zoology).

Botany.

| S.A.M. | T.C.D. | S.A.P.L. | B. | T. | |
|---|---|---|---|---|---|
| 3*a* | 728*a* | | | | |
| 3*b* | 728*b*+729 part | | | | |
| 4 | 729 part | | | | |
| 5 | 730 | x | | | |
| 7 | 843 | B 6 | | x | |
| 9 | 811 | B 28 | x | | |
| 11 | | | | | |
| 13 | | | x | | |
| 15 | | | | x | |
| 17 | | | x | | |
| 19 | | | x | x | |
| 21 | | | | x | |
| 23 | | | | | |
| 25 | | | x | | |
| 27 | | | x | x | |
| 29 | | | | | |
| 31 | | | | | |
| 33 | 813 | B 20 | | | |
| 35 | 861 | B 40 | | | |
| 37 | 835 | B 4 | | x | |
| 39 | 857 | B 21 | x | x | |
| 41 | 821 | B 2 | | x | |
| 43 | 785 | B 35 | | x | |
| 45 | 805 | B 10 | | | |
| 47 | 803 | B 18 | | | |
| 49 | 809 | B 39 | | | |
| 51 | 815 | B 5 | | x | Cf. fol. 89 |
| 53 | 795 | B 24 | | | |
| 55 | 801 | B 17 | | x | |
| 57 | 867 | | | | |
| 59 | 855 | B 34 | | x | |
| 61 | 859 | B 11 | | | |
| 63 | 799 | B 23 | | | |
| 65 | 845 | B 29 | | | |
| 67 | 849 | B 14 | | x | |
| 69 | 833 | B 31 | | x | |
| 71 | 865 | B 19 | | | |
| 73 | 839 | B 1 | | x | |
| 75 | 787 | B 27 | | | |
| 77 | 837 | B 32 | | x | |
| 79 | 819 | B 30 | | | |
| 81 | | | | | |
| 83 | | | x | | |
| 85 | 869 | B 25 | x | | |

| S.A.M. | T.C.D. | S.A.P.L. | B. | T. | |
|---|---|---|---|---|---|
| 87 | | | x | | |
| 89 | | | x | | Cf. fol. 51 |
| 91 | | | x | | |
| 93 | 823 | B 38 | | | |
| 95 | 797 | B 36 | | | |
| 97 | 841 | B 3 | | | |
| 99 | 807 | B 13 | | | |
| 101 | 791 | B 26 | | | |
| 103 | 863 | B 37 | | | |
| 105 | 831 | | | | |
| 107 | 853 | B 33 | | | |
| 109 | 793 | B 16 | | | |
| 111 | 817 | B 9 | | | |
| 113 | 825 | B 12 | | | |
| 115 | 829 | | | | |
| 117 | 789 | B 22 | | | |
| 119 | 827 | B 15 | | | |
| 121 | 851 | B 7 | | | |
| 123 | 847 | B 8 | | | |

Zoology.

| S.A.M. | T.C.D. | S.A.P.L. | T. | |
|---|---|---|---|---|
| 128 | 761 | Z 14 | | |
| 130*a* | { 759 upper figure } | Z 13 | | |
| *b* | 760 part | | | |
| 132 | | | | |
| 134 | | | | |
| 136 | 783 | | | |
| 138 | 781 | | | |
| 140 | 779 | | | |
| 142 | 735 | Z 2 | | |
| 144 | 743 | | x | "Grand Lezard du Cap" |
| 146 | 775 | | | |
| 148 | 773 | | | |
| 150 | 769 | | | |
| 152 | | | | |
| 154 | [745] | Z 5 | | |
| 156 | 777 | | | |
| 158 | 771 | | x | "La Ceraste ou Serpent Cornu" |
| 160 | 751 | Z 1 | | |

S.A.M. has 16 plants not in T.C.D., of which 9 were figured by Burman.
,, ,, 3 animals not in T.C.D. (4 including T.C.D. 745, which has text only, picture missing).
,, ,, 1 panorama not in S.A.P.L.
,, ,, 19 plants not in S.A.P.L.
,, ,, 12 zoological folios (21 pictures) not in S.A.P.L.

All the S.A.M. pictures refer to van der Stel's Namaqualand Expedition except two plants, viz. : fol. 21 (*Brunsvigia*) not dated, and fol. 97 (70) collected by van der Stel on 30th January, 1686, four days after his return to the Cape.

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Concordance of all pictures in the three series : T.C.D., S.A.P.L., and S.A.M., with identifications. The zoological names are from Waterhouse (1932, p. 173), revised by Barnard ; the botanical names by Compton, Pillans and Miss Leighton.

| T.C.D. | S.A.P.L. | S.A.M. | Subject. |
|---|---|---|---|
| 728 | — | 3 | Panorama. |
| 730 | x | 5 | Panorama. |
| 731 | — | — | Namaqua man and woman. |
| 733 | — | — | Mierkat (*Suricata suricatta*). |
| 735 | Z 2 | 142 | Hare (*Lepus*) and Caterpillar of a Saturniid moth. |
| 737 | Z 3 | — | Elephant Shrew (*Macroscelides*).* |
| 739 | — | — | Two Hares (*Lepus*). |
| 741 | Z 4 | — | Chameleon (*Chamaeleo namaquensis*). |
| 743 | — | 144 | Lizard (*Cordylus cataphractus*).† |
| 745 | Z 5 | 154 | Lizard (*Agama* sp.). In T.C.D. picture missing but text 746 present.§ |
| 747 | Z 7 | — | Cape Canary (*Serinus canicollis*). In Waterhouse wrongly identified as " Pied Barbet." |
| 749 | Z 11 | — | Capped Wheatear. |
| 751 | Z 1 | 160 | River fish (*Barbus capensis*). |
| 753 | Z 8 | — | Sacred Ibis. |
| 755 | Z 10 | — | European Bee-eater. |
| 757 | Z 9 | — | Namaqua Sandgrouse. |
| 759 | Z 13 | 130 | Namaqua Dove and Wood Dove. Only the upper figure in S.A.M. |
| 761 | Z 14 | 128 | Namaqua Dove. |
| 763 | Z 12 | — | Red-wing Spreeuw. |
| 765 | — | — | Speckled Mousebird. |
| 767 | Z 6 | — | White-backed Mousebird. |
| 769 | — | 150 | Upper figure : Yellow-lipped Snake (*Leptodira*) ; lower : probably Egg-eater (*Dasypeltis*). |
| 771 | — | 158 | Horned Adder (*Bitis cornuta*). |
| 773 | — | 148 | Mole Snake (*Pseudaspis cana*). |
| 775 | — | 146 | Upper figure : possibly young Mole snake ; lower : possibly Legless Lizard (*Acontias*). |

* Petiver (Gazophylacii Naturae . . . . i. pl. xxiii. fig. 9, 1702) reproduced a copy of this which he named *Mus araneus capensis*, the Great Cape Shrew Mouse. W. L. Sclater. Mammals of South Africa, ii. p. 147, 1901.

† Pictures resembling T.C.D. 741 and 743 are reproduced in Tachard, (1st voyage) figs. xi and xiii ; and Petiver, pl. lviii. figs. 11 and 12.

§ Tachard, fig. xii, and Petiver, pl. lvii, fig. 15, figured an Agama-like lizard, but with three crosses on the back in place of the lozenge-shaped patches. " Cross-back'd Cape Lizard. A very particular Animal which I should be glad to see. I figured it from Father Tachard's Cape designs." (Petiver).

| T.C.D. | S.A.P.L. | S.A.M. | Subject |
|---|---|---|---|
| 777 | — | 156 | Yellow Cobra (*Naia flava*). In Waterhouse identified as " ? Mamba." |
| 779 | — | 140 | Two Scorpions (*Opisthophthalmus* and *Parabuthus*). |
| 781 | — | 138 | Two Centipedes (*Scolopendra*) and Spider (*Argiope*). |
| 783 | — | 136 | Grasshopper (*Hetrodes*) and Solpuga. The latter figure unidentified in Waterhouse. |
| — | — | 132 | Two Beetles (*Julodes* and *Anthia*). |
| — | — | 134 | Ant-Lion and Stick-insect. |
| — | — | 152 | Two lizards (*Eremias*). |
| | | (All | the following are plants).* |
| 785 | B 35 | 43 | Lapeyrousia anceps Ker. |
| 787 | B 27 | 75 | Scelotium sp. |
| 789 | B 22 | 117 | Veltheimia glauca Jacq. |
| 791 | B 26 | 101 | Pteronia sp. |
| 793 | B 16 | 109 | Sarcocaulon sp. |
| 795 | B 24 | 53 | Lachenalia hirta Thbg. |
| 797 | B 36 | 95 | Morea edulis Ker. |
| 799 | B 23 | 63 | Aloe dichotoma L.f. |
| 801 | B 17 | 55 | Gladiolus carinatus Ait. |
| 803 | B 18 | 47 | Lebeckia cytisoides Thbg. |
| 805 | B 10 | 45 | Heliophila sp. |
| 807 | B 13 | 99 | Acacia karoo Hayne. |
| 809 | B 39 | 49 | Euclea multiflora Hiern. |
| 811 | B 28 | 9 | Anesorhiza sp. |
| 813 | B 20 | 33 | Montinia caryophyllacea Thbg |
| 815 | B 5 | 51 | Nemesia bicornis Pers. |
| 817 | B 9 | 111 | Asparagus capensis L. |
| 819 | B 30 | 79 | Heeria argentea Engl. |
| 821 | B 2 | 41 | Aloe variegata L. |
| 823 | B 38 | 93 | Ficus cordata Thbg. |
| 825 | B 12 | 113 | (Asclepiadaceae). |
| 827 | B 15 | 119 | Pelargonium echinatum Curt. |
| 829 | — | 115 | Gladiolus Watermeyeri L. Bolus. |
| 831 | — | 105 | Cyphia digitata Willd. |
| 833 | B 31 | 69 | Royena hirsuta L. |
| 835 | B 4 | 37 | Babiana tubata Sweet. |
| 837 | B 32 | 77 | Asclepias fruticosa L. |
| 839 | B 1 | 73 | Wurmbea capensis Thbg. |
| 841 | B 3 | 97 | Xysmalobium undulatum R. Br. |
| 843 | B 6 | 7 | Aloe melanacantha Berger. |
| 845 | B 29 | 65 | Aloe khamiesensis Pillans. |
| 847 | B 8 | 123 | Euclea acutifolia E. Mey. |
| 849 | B 14 | 67 | Albuca altissima Dryand. |
| 851 | B 7 | 121 | Euphorbia stellaespina Haw. |
| 853 | B 33 | 107 | Gorteria sp. |
| 855 | B 34 | 59 | Erythrophysa alata Hutchinson. |
| 857 | B 21 | 39 | Cotyledon decussata Sims. |
| 859 | B 11 | 61 | Walleria armata Schltr. |
| 861 | B 40 | 35 | Euphorbia loricata Lam. |
| 863 | B 37 | 103 | Indigofera psoraleoides L. |

* While most of the botanical names can be regarded as true identifications, some are probably incorrect as to species or even genus, the simplified and conventional nature of the drawings making certainty impossible. Evidence derived from dates, localities, native names, etc., has been taken into account. (R. H. Compton, N. S. Pillans, F. M. Leighton).

| T.C.D. | S.A.P.L. | S.A.M. | Subject. |
|---|---|---|---|
| 865 | B 19 | 71 | Mundia spinosa DC. |
| 867 | — | 57 | Pelargonium fulgidum Willd. |
| 869 | B 25 | 85 | Pelargonium pulchellum Curt. |
| — | — | 11 | Limeum capense Thbg. |
| — | — | 13 | Conophytum sp. |
| — | — | 15 | Ornithogalum suaveolens Jacq. |
| — | — | 17 | Euphorbia hamata Sweet. |
| — | — | 19 | Gamolepis speciosa Pillans |
| — | — | 21 | Brunsvigia appendiculata Leighton. |
| — | — | 23 | Polanisia lutea Sond. |
| — | — | 25 | Euphorbia mauritanica L. |
| — | — | 27 | Pelargonium oblongatum E. Mey. |
| — | — | 29 | Ficus cordata Thbg. |
| — | — | 31 | Mundia spinosa DC. |
| — | — | 81 | Tritonia crispa Ker. |
| — | — | 83 | Peucedanum sp. |
| — | — | 87 | Manulea benthamiana Hiern. |
| — | — | 89 | Nemesia cheiranthus E. Mey. |
| — | — | 91 | Othonna leptodactyla Harv. |

| | T.C.D. | S.A.P.L. | S.A.M. | | |
|---|---|---|---|---|---|
| Panorama | 2 | 1 | 2 | 2 | known. |
| Namaqua | 1 | — | — | 1 | known. |
| Zoology (+1 missing 26). | 25 | 14 | 17 | 29 | different folios known, containing 41 different pictures. |
| Botany | 43 | 40 | 59 | 59 | different pictures known. |
| | 71 (72) | 55 | 78 | 91 | |

T.C.D. lacks 3 zoological folios (excluding 745 of which the text is present) and 16 botanical folios.

S.A.P.L. lacks 1 panorama, Namaqua, 15 zoological and 19 botanical folios.

S.A.M. lacks Namaqua and 12 zoological folios.

## Tachard.

The account of Père Tachard's first voyage to Siam* contains pictures

* Guy Tachard. Voyage de Siam . . . . . Amsterdam, 1688. (8vo. edition). Some of these illustrations would seem to be copies of pictures given to Tachard by Claudius. "Comme ce savant Médicin [Claudius] a déja fait quelques Voyages . . . . . c'est de luy que nous avons tiré toutes les connoissances que nous avons de ce Païs, dont il nous donna une petite Carte faite de sa main avec quelques Figures des Habitans du Pays & des Animaux les plus rares que j'ay fait ajouter icy." (pp. 65, 66).

The figure (fig. vii, called Remore in the Instructions to binder at end of volume) of the Rhinoceros, however, is a copy of Durer's famous engraving printed in Gesner, *Hist. Anim.* (1551-1587).

of two native types : Hottentot man and woman, Namaqualand man and woman ; and eight animals. Two of the latter " La Ceraste ou Serpent Cornu " (fig. x) and " Grand Lezard du Cap " (fig. xiii) correspond with S.A.M. fols. 158 and 144. A third (fig. xi) represents a chameleon corresponding with T.C.D. 741 and S.A.P.L. No. Z 4.

Sixteen plants, on three plates, are reproduced in the Second Voyage.* All these 16 illustrations are paralleled in S.A.M., but 4 of them (corresponding with S.A.M. fols. 15, 19, 21, 27) are not in T.C.D. Three of them (S.A.M. fols. 19, 27, 39) are also in Burman. Tachard's illustrations resemble in many respects the S.A.M. pictures more closely than they do the corresponding pictures in T.C.D. ; but obviously they were not copied from the Codex Witsenii dated 1692.

S.A.M. fol. 15, paralleled in Tachard, does not appear in T.C.D., S.A.P.L., or Burman.

The Namaqua man and woman corresponds with T.C.D. 731, but the picture of the Hottentot man and woman does not occur in T.C.D., S.A.M., or S.A.P.L.

### Johannes Burman.

J. Burman (*Decades* 1738-39) figured 92 plants from the *Codex Witsenii*, 34 from the *Herb. Witsenianum*, and 33 from the *Codex Simon van der Stel.*

None of the plants described and figured from the two latter sources occur in the S.A.M. volume, which is one of three volumes comprising the *Codex Witsenii* (*supra* p. 3). Only 12 of its pictures have been copied by Burman to illustrate the Decades (" ex hoc fonte pro parte hausit," see fol. 1.), viz. : folios 9, 13, 17, 19, 25, 27, 39, 83, 85, 87, 89 and 91 (see concordance p. 7). Where are the other two volumes of the *Codex* containing the remainder (70) of the 92 plants ?

Only 3 of the 12 pictures used by Burman (S.A.M. fols. 9, 39, 85) occur in T.C.D. (811, 857, 869), and it is obvious that Burman did not use T.C.D. for any of these illustrations. Nor did he use Tachard. S.A.M. fol. 89 represents, in a crude and less exact manner, the same plant as fol. 51, but Burman took his illustration (Tab. xl. fig. 3.) from fol. 89, not from Tachard whose reproduction is more like fol. 51.

S.A.M. fols. 13, 83, 87, 91 do not appear to have been figured in Plukenet or Petiver, as N. L. Burman gives no references to them.

* Second Voyage du Pere Tachard . . . . au Royaume de Siam . . . . . Amsterdam, 1689. (8vo. edition).

*Plants.*

NATIVE NAMES.

The native names in S.A.M. correspond with those in T.C.D., except : S.A.M. fol. 43 has *cabung* not *chabi* as in T.C.D. 786 ; T.C.D. has 836 *cabong*, the corresponding S.A.M. 37 gives no name ; S.A.M. 73 has *chabÿ*, the corresponding T.C.D. 840 gives no name. All these pictures represent bulbous plants.

In addition to the above two names, there are some slight differences in spelling :

| | | | |
|---|---|---|---|
| *qua roebe* | (S.A.M. 117) | *quaroube* | (T.C.D. 790) |
| *chamare* | ,, 9) | *gammare* | ,, 812) |
| *dgoree* | ,, 41) | *degorée* | ,, 822) |
| *tkaubÿ* | ,, 121) | *thaubÿ* | ,, 852) |
| *samoe* | ,, 59) | *sumoe* | ,, 856) |
| *kebeep* | ,, 39) | *hobeep* | ,, 858) |

The name *cabouti* (S.A.M. 119) does not occur in T.C.D. 828, or elsewhere.

*Animals.*

Where S.A.M. has pictures corresponding with those in T.C.D. the names agree. The (Namaqua) name *Ou* in T.C.D. 780 does not occur in the corresponding S.A.M. 140, only the (Grigriqua) name *eynte*.

Slight differences in spelling occur :

| | | | |
|---|---|---|---|
| *nabasse* | (S.A.M. 142) | *nabosse* | (T.C.D. 736) |
| *aroebe* | ( ,, 142) | *aroubi* | ( ,, 736) |
| *quelip* | ( ,, 130) | *queip* | ( ,, 760) |
| *noumqueab* | ( ,, 146) | *nounquab* | ( ,, 776) |
| *coerequequekam* | ( ,, 138) | *coeruquekekam* | ( ,, 782) |
| *toucomqueri* | ( ,, 138) | *thoucomqueri* | ( ,, 782) |
| *holop* | ( ,, 138) | *houeb* | ( ,, 782) |
| *gnarebÿ* | ( ,, 136) | *gnarebi* | ( ,, 784) |

The name *gambrÿ* occurs in T.C.D. as the name of a plant (850), and *gambri* as the name of a bird (764). The former corresponds with S.A.M. 67 (the same name occurs also in fol. 15), but no folio corresponding to the latter is in S.A.M.

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TRANSCRIPTIONS OF THE NATURAL HISTORY NOTES, TRANSLATIONS, AND COMMENTS.

FOL. 1.

On the two sides of a small sheet of paper attached to the first cover page (fol. 1) occurs the following inscription. The sheet was cut from a

larger sheet, and measures $6\frac{2}{5}$ x 4 in. ; at the top a portion of the water-mark remains, viz. : in block capitals SUPEI [superfine ?].

a(front). Plantae & Animalia in/Promontorio Bonae Spei/Africes ad naturam/delineata & colorata/A° 1692, in usum/ Con$^{s}$. Amstelad., nec non/Rerum Orientalium/Directoris Nicolai/Witsen./Ex Bibliotheca cl. N.L./Burman, dum in vivis/esset Botanices Professoris/in Ill. Amstelad. Athe-/naeo, publice distracta L./B.27 Novembris A° 1800.

b(reverse) Systhematica Planta-/rum denominatio/apposita est manu/cl. viri./Joh$^{s}$ Burman, N$^{i}$. L$^{ii}$./pater, itidem Botanices/Prof. Amstelad., anteriorque/hujus collectionis poss-/essor, delineationes &/descriptiones Planta-/rum Africanarum A°/1738, 9 a se editarum,/ex hoc fonte pro parte/hausit. B.

There are three minor errors in Waterhouse's transcription : (front) Ex Bibliotheca *d* N. L. Burman, should read *cl* ; (reverse) Sys*t*ematica should read Sys*th*ematica ; and *praeposita* should read *apposita*.

Although this note states that N. L. Burman (pater) inscribed the systematic names of the plants, Waterhouse (1932, p. xxii) merely says they are " in a different handwriting " from the original Dutch notes.

When N. L. Burman made these entries cannot be determined ; but at least the entry on fol. 21 cannot be earlier than 1753 because it contains the reference to Heisterus.

In Burman's handwriting the numerals 4 and 9 are liable to be confused : 4 is like a 9 with straight downstroke, but the real 9 has a long curved tail (Plate XII, fol. 63 (53) reverse).

## FOL. 2.

The second cover-page (front) has the following three inscriptions :

In the handwriting of E. L. Layard :*

South-African Museum./(Presented by The South-African/ Literary and Scientific Institution,/25th June, 1855).

In the handwriting of Nicolaas Witsen :

Dit Werk is/voor mij Aen de/Kaap gemaekt/N : Witsen/1692.

* South African Museum founded 25th June, 1855. An extract from the Minutes of the South African Literary and Scientific Institute, dated 23rd June 1855, is filed in the first Minute-book of the Museum Trustees, recording the handing over of books and other possessions of the Institute to the Museum, signed by D. Tennant, Hon. Sec. But no inventory of the articles so handed over is known. E. L. Layard, Curator, 1855-1872.

In the handwriting of (presumably) Sir J. A. Truter :

Presented bÿ Sir Johannes/Andreas Truter Knight, etc. etc. etc./ to the S.A. Literary Society/ in 1829/J.A.T.[?] Secÿ.*

FOL. 3a. (T.C.D. 728) Plate I.

For purposes of comment the two panoramas (fols. 3 and 5) may be taken together. The first, showing van der Stel's camp in Namaqualand, in general resembles T.C.D. (Waterhouse, 1924, fig. 1. and 1932, plate facing p. 97) but differs in certain details, e.g. 17 waggons around the camp instead of 15.† The far distance beyond the head of the valley above the camp does not represent "distance" nearly as well as does T.C.D. ; there are only three hills, and the righthand one on the skyline is much the largest ; the compass bearing is drawn from the latter instead of from the ridge B.B.B. on the left. The details of the rocks, bushes, and Aloe trees differ slightly.

Fol. 5 is also very similar to T.C.D. 730, though differing slightly in details. The compass bearing is in the same position, but the peak on the left is more conical than in T.C.D., and higher than the thumb-like peak farther to the left.

Both panoramas have been done with painstaking care, and the S.A.M. pictures cannot be considered of inferior *draughtsmanhip* than those in T.C.D. As regards colouring, however, the panorama (there is only one corresponding to S.A.M. 5, T.C.D. 730) in S.A.P.L. is very much more natural than S.A.M., the distant peaks being bluish-grey instead of green.

FOL. 3b. (=T.C.D. 728 reverse+729 part).

The front margin is rubbed and torn, and only some of the reference letters remain.

[A-]A.A. Dit is de Coperberg, door den E Heer Commandeur/ Simon van der Stel, den 21 Octob: 1685, ondect, en ruÿm/ 10 mÿlen verre personelÿk gevisiteert, en doorgaens/een gank en ader, die van onder uÿt den grond op/tot den top van den berg klimt, en ten minsten/van 8 tot 9 voeten, dog merendeels van 2 â 3 roede/breedte, ganschelÿk van een Coleur, en met Spaans/groen uÿtgeslagen bevonden.

* I have not discovered whether Truter was actually Secretary of the S.A. Literary Society, but the initials can be read as "J.A.T." written with a flourish. See footnote p. 3.

† Cf. G. McC. Theal. History of South Africa . . . . 1652-1795, London, 2nd ed. 1897, i. p. 275. "The train as now completed consisted of fifteen waggons."

[H-]V : R. Een Berg gansch en geheel uÿt Coper-ertz, van/boven tot beneden toe, bevonden, dierhalven aldaer/wel 18 voeten diep gegraven, en hand over hand rÿc-/ker minerâl ten voorschÿn gekomen is.

[St]M. Een berg halv van ertz, dog werd gelooft in-/nerlÿk alsoo rÿk als die van H : V : R :, en een ende/deselve gank of ader te wesen, dierhaven, tot 4 voeten/diep, bearbeÿd, en van seer goed minerâl bevonden.

(=T.C.D. 729).

[S:V:]S : Een berg met een groote vlacte, dewelke de boven-/gem$^{te}$ gank wel 2 a 2½ roede breed doorsnÿd, is tot 2/voeten diep bearbeÿd, ende 't ertz soo goed als/het voorgaende geoordeelt.

[B:B:]B : De gank of Coper-ader, die als gesegt ruÿm 10/mÿlen verre is vervolgt, en welkers eÿnde onbekent is.

Een

FOL. 4. (=T.C.D. 729 part).

The front margin has been trimmed. Continued from fol. 3b.

C.C.C. Een Fontain of gestadig lopend beeckje [ . . . ? . . . /alsulken riet, als in 't Vaderland valt, beÿder [ . . . ? . . . /bewassen.

D.D.D. Aloes-bomen.

FOLS. 3b and 4 (translation).

A.A.A. This is the Copper Mountain discovered by the Honourable Commander Simon van der Stel on 21st October 1685, and visited by him in person for a distance of 10 miles, and [consisting] throughout of one lode and vein, which rises from out of the ground to the top of the mountain, and [is] at least 8 to 9 feet, but in most parts 2 to 3 rods* broad, all of one colour throughout, and found to be covered with verdigris.

H.V.R. A mountain consisting entirely of copper ore from top to bottom, therefore excavated a good 18 feet deep, and " hand over hand " rich mineral was brought to light.

St. M. A mountain half of ore, but believed to be as rich internally as H.V.R., and to be one end of the same lode or vein, therefore worked to 4 feet deep, and found to be of very good mineral.

S.V.S. A mountain with a large level space which is cut through by

* " The *roede* varies locally between 3½ and 4 metres. The Rynland ' roede ' in use at the Cape contained 12 feet." Waterhouse, 1932, p. 172.

the above-mentioned lode fully 2 to 2½ rods in width*; was worked to a depth of 2 feet, and the ore considered to be as good as the afore-mentioned.

B.B.B. The lode or vein of copper, which as mentioned was followed for a distance of 10 miles, and whose termination is unknown.

C.C.C. A spring or constant-flowing brook, both banks overgrown with the same kind of reeds as in the Fatherland.

D.D.D. Aloe-trees.

FOL. 5. (=T.C.D. 730) Plate I.

The legend is at the bottom of the picture, lengthwise, near the back margin.

E.E.E.E. Een vlacte omtrent drie m÷len Noord-waarts van den Coperberg gelegen, in 't/midden van dewelke een vlacke Horizontale klip men gevonden heeft, u÷t/welkers poren of gaetjes 't Spaansgroen gel÷ksaam u÷tborreld en te voorsch÷n komt.

E.E.E.E. A plain situate about three miles northward of the Copper mountain, in the middle of which was found a flat horizontal rock, from the pores or holes of which verdigris bubbles, so to speak, and comes to light.

FOL. 7. (=T.C.D. 843) Plate II.

a. Tachard's figure has the stem uncut, but is otherwise more like S.A.M. than T.C.D., in having the same number (3) of leaves on either side of the centre one, and 4 flowers, symmetrical, the lower two open, the upper two unopened; 5 fruits (like T.C.D., but differently arranged) instead of 4; the main root curves to right, contrary to S.A.M. and T.C.D.

b. (=T.C.D. 844).

Semper vivum Spinosum, werd gevonden op klip en sand-/agtige plaatsen, omtrent het minerâl gebergte, en word/van de Hottentots Goree genaamt, gevonden den 24$^{e}$/Octob$^{r}$ 1685.

Sempervivum spinosum, was found in rocky and sandy places near the Copper mountains and is called by the Hottentots Goree,† found 24th October 1685.

[N. L. Burman.] Aloe capensis valde aculeata. Petiv. Gazoph. Tab. 88, Fig. 2.

* Waterhouse (1924, p. 309 and 1932, p. 161) translates: ". . . . with a great level section which cuts through the above-mentioned lode for fully 2 to 2½ rods in depth . . . . "; which is neither correct nor sensible.

† "The Aloe or Goree plant . . . . " O. F. Mentzel, Cape of Good Hope, ii, 1787. Van Riebeeck Society Public. No. 25. Engl. translation. Author's preface, p. 2, 1944.

FOL. 9. (=T.C.D. 811) Plate II.

a. Burman's illustration, reversed in printing, is a very close copy of S.A.M., with the same number of leaf-whorls (36) arranged in the same manner. T.C.D. has more numerous (40) whorls, differently arranged, rootlets arising from top of root-stock, but none from extreme base. S.A.P.L. has rootlets arising from top and bottom of root-stock, and also from the constriction near base.

b. (=T.C.D. 812).

Dese Wortel van een angename smaeck is wind-brekende en/'t water afsettende, bÿ de inwoonders in groot gebruik, de bladeren/ daer af zÿn van een sterke reuk, gelÿkende naer de reuk en/smaek van Peterselie, wast op vette grond, en oude kralen,/langs de Bergrivier, word van de Inwoonders Chamare ge-/noemt ; gevonden den 1 Septemb : 1685.

This root of a pleasant taste is carminative and diuretic, much used by the inhabitants, the leaves have a strong smell like the smell and taste of parsley, grows on fertile soil and old kraals along the Berg River, is called by the inhabitants Chamare ; found 1 September 1685.

[N.L.B.] Apium radice crassa aromatica, foliolis linearibus collectis. Burm. Dec. pl. Africa. pag. 197, Tab. 72, Fig. 1.

Burman gives an almost literal Latin translation of the Dutch text " ex annotatis in *Cod. Wits.* . . . " (with this exception " . . . locis humidis ac pinguibus ").

The T.C.D. text, as reproduced by Waterhouse, has " af*l*ettende " S.A.M. has quite distinctly " afsettende." Cf. fol. 113 and T.C.D. 826, where both texts have " aftesetten."

FOL. 11. (Not in T.C.D.) Plate II.

b. Dit onbekende kruÿdjen, angenaem van reuk, wast op/sommige vogtige plaatsen, kruipende langs de grond, gelÿk/een convolvulus, waer onder het ook sal kunnen gereeckent/werden is gevonden den 10 Septemb : 1685.

This unknown weed, of a pleasant smell, grows in some dampish places, creeping along the ground like a Convolvulus, under which it may in fact be classified, was found on 10 September 1685.

FOL. 13. (Not in T.C.D.) Plate II.

a. Burman's illustration, reversed, but with 10 " lobes ", is an almost exact copy.

b. Dit gewas van binnen vervult zÿnde, met een brak en/suiragtig vogt ofte slÿm, eenigsins bekwaam, in de grootste/nood de dorst te verslaen, maer van een schadelÿke con-/sequentie, vermits 't groote pÿn in de buik veroorsacckt,/wast an brakke en soutagtige valeÿn, doorgaans in 't land/der Namaquas, en is gevonden den 10 Decemb : 1685.

This growth filled with a brack and sour juice or slime, somewhat pleasant, useful in direst necessity to slake thirst, but with harmful consequences because it causes great pain in the stomach, grows in brack and salt-pan-like valleys throughout the country of the Namaquas, and was found 10 December 1685.

[N.L.B.] Lÿcoperdastrum soboliferum, altius radicatum, glabrum, oblongum, viride. Burm. Dec. pl. Africa. pag. 22. Tab. 10., Fig. 2.

FOL. 15. (Not in T.C.D.). Plate II.

a. Tachard's picture, reversed, is similar but more stylishly executed ; both have one open flower and three buds, but the bent leaf is more undulate in Tachard.

b. Dit is de twede soorte van der Hottentoten haare/Gambrÿ, maer onbekwaam om te gebruicken, wast an di-/versche plaatsen, en van ons geobserveert den 10 Septemb :/1685.

This is the second kind of the Hottentots' Gambry, but unpleasant to use, grows in various places, and was observed by us on 10 September 1685.

[N.L.B.] Ornithogalum bifolium, foliis subulatis, floribus comosis. The first kind of Gambry is not mentioned as such, but fol. 67 (T.C.D. 849) depicts another bulb with the same native name.

FOL. 17. (Not in T.C.D.) Plate II.

b. Dit kruid is een soorte van Ezula, met een seer cor-/rosÿv sap, gevonden den 19e Septemb : 1685.

This plant is a kind of Ezula*, with a very corrosive sap, found 19th September 1685.

[N.L.B.] Euphorbium luteum, squamis hamatis. Petiv. Gazoph. Tab. 86, Fig. 6.

Euphorbium caule rotundo, foliolis hamatis flore

* Engl. Spurge, Germ. Wolfsmilch. See : Dodonaeus, Cruydtboeck, pp. 659*b*, 660. Leyden, 1608.

quadrifido flavo. Burm. Dec. pl. Afric. pag. 14. Tab. 6, Fig. 3.*

FOL. 19. (Not in T.C.D.) Plate II.

a. Burman's figure is a copy, reversed, with the same number of divisons in the leaves, and the same number of ray florets. Tachard's figure, also reversed, has the bud (or unripe fruit) on a stalk arising halfway along the main stalk bearing the open flower, the latter having more numerous ray florets.

b. Dese bloeme van een angename reuk, verwarmende, ende/bekwaam in stovingen te gebruicken, word van de Inwonders/Cabaröe genoemt, is gevonden den 4$^{e}$ Septemb : 1685.

This flower of a pleasant smell, " calefaciens, et fomentis optime inservire possit ", called by the inhabitants Cabaröe, was found 4th September 1685.

[N.L.B.] Tagetes foliis instar cornu cervi divisis, flore sulphurco, reflexo. Burm. Dec. pl. Afric. p. 166, Tab. 60, Fig. 2.

Burman says " de hoc flore in *Cod. Wits.* notatur . . . " and quotes (in latin) the whole of the above text.

FOL. 21. (Not in T.C.D.) Plate II.

a. Tachard's illustration is more elaborate, with 20 flower stalks, mostly with open flowers, and numerous rootlets.

b. Dese seer schoone Bloeme word langs de berg-rivier, en an/vele plaatsen omtrent de Caab gevonden en bloeÿt in Janu-/ario.

This very pretty flower is found along the Berg River and in many places around the Cape, and blooms in January.

[N.L.B.] Brunswigia umbellata carnea, cujus rubram speciem descripsit Heisterus in peculiari tractatu, qui primus hisce plantis Brunswigia nomen imposuit, in honorem ducis Brunswigensis.†

* The second half of Burman's descriptive note (p. 14) is worth quoting in full : " Esula succo viroso haec in *Cod. Wits.* altero vocatur ; qui codex octuoginta circiter continet plantas elegantissime depictas naturalibus & vivis coloribus plantarumque partibus separatis, sed quae a *Pluknetio* & *Petiverio* omnes jam fere sunt delineatae, ita ut hi auctores & similem codicem forte ab eodem pictore elaboratum acceperint ; Figurae enim plantarum simili modo eademque forma delineatae in tribus his auctoribus occurrunt. hanc autem *Petiv.* tantum habet in *Gazophyl. Tab.* 86, *Fig.* 6, ubi vocatur Euphorbium luteum, squamis hamatis. Has duas rarissimas plantas [i.e. fols. 25 and 17, Burman, Tab. vi. Figs. 2 and 3.] hic exponere volui, & vacuo Tabula loco insculpi, quum nondum descriptae occurrerent, & *Gazophyl. Petiverianum* in paucissimorum tantum manibus versetur."

† Heister, L. 1683-1758.

*Descriptio novi generis Plantae . . . . Africanae ex Bulbosarum Classe, cui . . . Brunsvigiae . . . nomen imposuit. In qua simul multae botanicorum quorundam hallucinationes indicantur et emendatur.* Brunsvigae, 1753.

Beschreibung eines neuen Geschlechts von einer . . . Afrikanischen Pflanze . . . welche . . . den Namen Brunsvigia beygeleget . . . . Braunschweig, 1755.

The date of publication of *Brunsvigia* is given in Kew Index as 1755, not 1753.

Fol. 23. (Not in T.C.D.) Plate III.

b. Dit is een soorte van Trifolium of drie-blad en is gevonden/den 1$^{e}$ Septemb$^{r}$ 1685.
This is a kind of Trifolium or trefoil and was found 1st September 1685.
[N.L.B.] Sinapistrum triphylleum, seu Cleome Linneei.

FOL. 25. (Not in T.C.D.). Plate III.

a. Burman's figure, reversed, resembles S.A.M., but latter has one extra leaf at bottom of shoot, and lacks the one seed shown separately.

b. Dit kruÿd word genoemt Anteuphorbium, en is gevonden den/ 21 7b : 1685.
This plant is called Anteuphorbium, and was found 21st September 1685.
[N.L.B.] Euphorbium Ficoidis folio. Petiv. Gazoph. Tab. 90, Fig. 3. Euphorbium erectum caule simplici rotundo foliis triangularibus obpositis acutis. Burm. Dec. pl. Afric. pag. 13, Tab. 6, Fig. 2.
Burman (p. 13) : ". . . . in *Cod. Wits.* Anteuphorbium haec planta vocatur : quae insculpta solummodo invenitur in rarissimo illo exoticarum opere *Petiver. Gazophyl. nat.* & *art.*, Tab. 90, Fig. 3, ubi Euphorbium Ficoidis folio dicitur."

FOL. 27. (Not in T.C.D.). Plate III.

a. Burman's figure, reversed, is a very accurate copy of S.A.M., even to the number (11) of bracts below the flower-head. Tachard's figure, also reversed, is similar but the central flower projects above tke buds, the fruit is undulate throughout (not merely at tip as in S.A.M. and Burman), 9 bracts, and numerous fine rootlets on the main forked root.

b. Dit kruid is een soorte van Geranium, radice esculenta/of met een eetbare wortel, word van de Inwoonders Heÿn-/tame genoemt, is gevonden den 13 Septemb : 1685.
This plant is a kind of Geranium, radice esculenta, i.e. with an edible root, by the inhabitants called Heÿntame, was found 13 September 1685.
[N.L.B.] Pelargonium rapaceum bifolium floribus maculatis. Burm. Dec. pl. Afric. pag. 90, Tab. 35, Fig. 1.

FOL. 29. (Not in T.C.D.). Plate III.

b. Dese boom word an groote noÿt boven de 6 â 8 voeten ge-/vonden,

de vrugt daer af is niet bekwaam voor menschen,/maer 't saet daer in besloten, word soo veel te vlÿtiger/van de vogelties gesogt ; wast op hooge bergen, tusschen/de klippen, is gevonden den 13 7b : 1685.

This tree was not found greater than 6 to 8 feet in height, its fruit is not suitable for men, but the seeds enclosed therein are sought as much as possible by the birds ; grows on high mountains between the rocks, was found 13th September 1685.

[N.L.B.] Cerasus [written over the name Ficus] Africana, fructu coeruleo, folio longiore & angustiore.

FOL. 31. (Not in T.C.D.). Plate II.

b. Dit is een soorte van Genista met een Purpere bloem, gevonden den 2$^{e}$ Septemb$^{r}$ 1685.

This is a kind of Genista [Gorse] with a purple flower, found 2nd September 1685.

[N.L.B.] Genisto-Spartium Africanum, Ericae folio, floribus dilute purpureis.

FOL. 33. (=T.C.D. 813). Plate III.

a. Only 8 leaves instead of 11 shown in T.C.D., and arranged differently, only one fruit on left, no section of fruit ; the full view of flower shows 8 white " petals."

b. (=T.C.D. 814).

Dese Heester wast op Steenagtige plaatsen, de Vrugt daer/ af is in 't begin van smaek als een kruÿtnageltie, maer groot/werdende, begint deselve scherp te branden, niet wÿkende de/Castiliaansche Peper, onder welker soorten het ook sal kunne/gereeckent werden, wast langs, of omtrent de Olÿphants-/rivier, gevonden den 15$^{e}$ en 16$^{e}$ 7b:$^{r}$ 1685.

This shrub grows on stony places, its fruit when small tastes like a clove, but when larger has a sharp burning taste not unlike Castilian pepper, as a kind of which it can be classified, grows along or in the neighbourhood of the Olifants River, found 15th and 16th September 1685.

[N.L.B.] Epidendron Lÿchnidis flore Africanum. Pluken. Phyt. Tab. 174, Fig. 7.

FOL. 35. (=T.C.D. 861.). Plate IV.

b. (=T.C.D. 862.).

Dese Heester is een onbekende soorte van Ezula, met een/scherpe

corrosive melk, is nergens te vinden als op eenige/plaatsen langs de Olÿphants rivier, en gevonden den/15 Septemb : 1685.
This shrub is an unknown kind of Ezula, with a sharp corrosive milk [latex], is only to be found in some places along the Olifants River, found 15 September 1685.

[N.L.B.] Tithÿmalus Africanus arborescens squammato caule spinosus. Pluken. Phyt. Tab. 230, Fig. 5, &c.

T.C.D. 861 is reproduced in White, Dyer, & Sloane, Succulent Euphorbieae, i. fig. 262. 1941. (*E. loricata* Haw.).

FOL. 37. (=T.C.D. 835.). Plate III.

a. Tachard has 3 long leaves but only 6 short ones, 1 bud, 1 partly opened flower and 1 fully opened flower very similar to S.A.M., but reversed. S.A.P.L. B4 is beautifully coloured.

b. (=T.C.D. 836).
Dese welriekende bloeme komt voort uÿt een bolletie,/'t welk gebraden zÿnde soet en angenaem van smaek/is, maer veel daer af gegeten veroorsaect harde ver-/stoppingen in de buik, en is een ordinaris kostje voor/de inwoonders, is gevonden den 3 Septemb$^{r}$ 1685.
This sweet-smelling flower comes out of a bulb which when baked has a sweet and pleasant flavour, but if eaten in quantity causes constipation, is a common food of the inhabitants, found 3 September 1685.

[N.L.B.] Sisÿnrichium Africanum tricolor, caule nodoso angustifolium. Pluken. Phyt., Tab. 224, Fig. 7.
Croco affinis Capensis tricolor, caule nodoso. Petiv. Gazoph. Tab. 58, Fig. 3.

FOL. 39. (=T.C.D. 857). Plate V.

a. Tachard's figure is very similar in arrangement of leaves and flowers, but embellished with numerous rootlets on the stock and roots. Burman's figure (Tab. 19, Fig. 1) is an exact copy of S.A.M., improved by the engraver and reversed. T.C.D. has the flowers arranged differently, and one leaf cut to show cross-section.

b. (=T.C.D. 858).
Desen soorte van Sedum of Donderbaard, word gevonden/an steenagtige en sandige plaatsen van het lage land-/der Namaquas na de Zee-strand, word van de In-/woonders Kebeep genoemt, gevonden den 12 10 b$^{r}$ 1685.

This kind of Sedum or Stonecrop was found on stony and sandy places in the country of the Namaquas near the sea-coast, is called by the inhabitants Kebeep, found 12 December 1685.

[N.L.B.] Sedum Africanum terebifolium, flore Hermocallidis. Pluken. Phyt. Tab. 223, Fig. 1.
Aloe Cepae folio. Petiv. Gazoph. Tab. 89, Fig. 2.

FOL. 41. (=T.C.D. 821). Plate V.

a. Tachard is similar to S.A.M., but reversed, and with shorter uncut stem. S.A.M. and Tachard both have 3, instead of 4 as in T.C.D., leaves on either side of stem. Five flowers, 3 on left, 2 on right, lower one on each side open, closer together than in Tachard. S.A.P.L. B2 also has 3 flowers on left, 2 on right. S.A.M. has the leaves grass-green, but S.A.P.L. has them glaucous green, thus much nearer the natural colour.

b. (=T.C.D. 822).
Dese soorte van Semper Vivum wast op klip-agtige/plaatsen in 't land der Namaquas, en van deselve Dgoree/genoemt, gevonden den 16 Octob$^{r}$ 1685.
This kind of Sempervivum grows on rocky places in the country of the Namaquas and by the same called Dgoree, found 16 October 1685.
[N.L.B.] Aloe Africana vulgaris, similis, floribus rubris & paucioribus. Pluken. Phyt. Tab. 129, Fig. 1.
Aloe maculata laevis. Petiv. Gazoph. Tab. 88, Fig. 2. [sic, *laps. cal.* for 1.]

FOL. 43. (=T.C.D. 785). Plate V.

a. Tachard is similar to S.A.M., but reversed and with 4 instead of 5 leaves. T.C.D. has 5 leaves, veined, and 3 flowers.

b. (=T.C.D. 786).
Dese angename welriekende bloeme komt voor uÿt/een bolletie, 't welk soet en angenaem van smaak, en/wat adstringerende is, dient an de Inwoonders alhier voor/een gemene mondcost, wast op goede en vette grond langs/de picket-berg, word van haerlieden Cabung genaamt,/gevonden den 3 Septemb$^{r}$ 1685.

This pleasant smelling flower comes out of a bulb, which is of a sweet and pleasant taste, and astringent, serves the inhabitants everywhere as a general food, grows on good and fertile soil along the Picket-berg, called Cabung by the local people, found 3 September 1685.

[N.L.B.] Sisÿnrichium Africanum trianthophorum. Pluken. Phyt. Tab. 225, Fig. 1.
Sisÿnrichium trianthos umbellatum. Petiv. Gazoph. Tab. 85, Fig. 2.

FOL. 45. (=T.C.D. 805). Plate III.

a. Very crude in comparison with T.C.D. The 5 flowers are drab with blue centres, buds and roots green. S.A.P.L. B10 has the flowers pale blue.

b. (=T.C.D. 806).
Species Linariae met angename welriekende blauwe/bloemties, wast op sandige grond langs die Picquet-/-berg, gevonden den 13e Septemb : 1685.
A species of Linaria with pretty sweet-smelling blue flowers, grows on sandy ground along the Picquet-berg, found 13th September 1685.
[N.L.B.] Leucojum Africanum flore Lini coerulei, molluginis folio. D. Hermans. Pluken. Phyt. Tab. 200, Fig. 3.

FOL. 47, numbered 44. (=T.C.D. 803). Plate III.

a. One green, one brown seed-pod. The arrangement of the leaves is different (less spread out) from T.C.D., and the latter has only one seed-pod.

b. (=T.C.D. 804).
Species Cÿtisi arborescentis met gele bloemen, wast/langs de berg-rivier, gevonden den 31 Augusti 1685.
A species of arborescent Cytisus [broom] with yellow flowers, grows along the Berg River, found 31 August 1685.
[N.L.B.] Anagÿris flore luteo, angustis siliquas Africana. Pluken. Phyt. Tab. 133, Fig. 6.
Anagÿris Capensis, luteus, foliis acutis. Petiv. Gazoph. Tab. 83, Fig. 7.

FOL. 49, numbered 46. (=T.C.D. 809). Plate IV.

b. (=T.C.D. 810).
Dese boom van tamelÿke groote, groeÿt in de scheuren/en kloven van rotsen en klippen, draegt een vrugt/van wegen haer wonderlÿke smaek onbequaem voor/de menschen, maer niet van de kleÿne vogelties, werd/op diversche plaatsen van 't land der Namaquas gevon-/den, en van haer Cargosangk genaemt, is gevonden/den 6e Janÿ 1685.

This tree of moderate size grows in the fissures and clefts of rocks and stones, bears a fruit which in spite of its wonderful taste is unsuitable for man, but not for the little birds, was found in various places in the country of the Namaquas, called by them Cargosangk, found 6th January, 1685.

[N.L.B.] Cerasus Africana fructu coeruleo. Pluken. Phyt. Tab. 157, Fig. 5.
Cerasus capensis fructu coeruleo. Petiv. Gazoph. Tab. 57, Fig. 5.

FOL. 51, numbered 47. (=T.C.D. 815). Plate IV.

a. Tachard, reversed, is very similar but the two basal pairs of leaves and the next pair are omitted. S.A.P.L. B5 has the top flower in side view, the one on the left in front view. Burman has taken S.A.M. fol. 89 (66) as his copy for this species. Named in the lower-right-hand corner *Nemesia* in Dr. Pappe's neat handwriting.*

b. (=T.C.D. 816).
Species Pensees gevonden den 11 Septemb$^{r}$ 1685.
A species of Pansy, found 11 September, 1685.

[N.L.B.] Violae surrectae affinis, Pinguiculae facie. Capitis Bonae Spei. Pluken. Phyt. Tab. 134 [sic, *laps. cal.* for 234], Fig. 5.
Trientalis Capensis Dracocephali folio. Petiv. Gazoph. Tab. 58, Fig. 1.
Pinguicula foliis obpositis dentatis, floribus corniculatis. Burm. Dec. pl. Afric. pag. 106, Tab. 60 [sic, *laps. cal.* for 40], Fig. 3.

FOL. 53, numbered 48. (=T.C.D. 795). Plate V.

a. S.A.M. has pink-spotted flower-stalk, and bracts arising from bulb at base of stem.

b. (=T.C.D. 796).
Species H$\ddot{y}$acinthi gevonden den 8 Septemb$^{r}$ 1685.
A species of Hyacinth found 8 September, 1685.

[N.L.B.] H$\ddot{y}$acinthus Africanus Orchioides Serpentarius, folio singulari undato, pilis ciliaribus fimbriato, floribus ex aureo punicantibus. Pluken. Phyt. Tab. 195, Fig. 5, Petiv. Gazoph. Tab. 87, Fig. 8.

Petiver described this as "Comptonia Capensis lutea, monophylla, crispa" in honour of Bishop Compton. See also fol. 117 (80).

* C. W. L. Pappe, 1802-1862. Colonial Botanist at the Cape. Trustee of the South African Museum, 1855-1862.

FOL. 55, numbered 49. (=T.C.D. 801). Plate V.

a. Tachard similar to S.A.M., reversed, the 2 bent leaves stouter. S.A.P.L. B17 has the flowers coloured crimson.

b. (=T.C.D. 802).
Aquilegia ofte Akoleÿe met een purpere bloem,/en eetbare wortel, is gevonden den 11 7b[r] 1685.
Aquilegia or Columbine with a purple flower and edible root, found 11 September, 1685.

[N.L.B.] Gladiolus Africanus angustissimo folio, dilute purpurascens. Pluken. Phyt. Tab. 187, Fig. 4.
Gladiolus capensis purpureus, floribus uno versu dispositis. Petiv. Gazoph. Tab. 87, Fig. 1.

FOL. 57, numbered 50. (=T.C.D. 867). Plate V.

b. (=T.C.D. 828).
Geranium Columbinum, met schone rode bloemen,/werd gevonden omtrent de Berg-Fontein, den 13[e]/Septemb : 1685.
Geranium Columbinum with beautiful red flowers was found around the Berg-fontein 13th September, 1685.*

[N.L.B.] Geranium Africanum noctu olens ruberrimo Anemones folio latiore. Pluken. Phyt. Tab. 186, Fig. 5.
Geranium auric : Arthemisiae folio, fl. sanguineo Petiv. Gazoph. Tab. 84, Fig. 9.

The pictures and notes of this folio and fol. 119 (81) have been transposed in T.C.D. and S.A.M. ; as was quite likely to happen in the case of two such similar plants if one or more copyists were working from the originals. S.A.P.L. B15 has picture and text corresponding with T.C.D. 827, 828.

FOL. 59, numbered 51. (=T.C.D. 855), Plate IV.

a. Tachard is more like S.A.M. than T.C.D., reversed, with only three sprays of leaves.

b. (=T.C.D. 856).
Dit gewas werd op sandige plaatsen gevonden de vrugt/daer af :/: welke in drie deelen bestaat, en gelÿk als in/een blaas, als den Alkekengi besloten leÿd :/: is van/een bittere en adstringerende smaeck, desselvs krag-/ten zÿn tot nog toe onbekent, word gevonden

* Berg- or Bergh-Fontein. The Journal (T.C.D.) says the place was called after Lt. Bergh. See : Journal of Olaf Bergh. Van Riebeeck Society, Public. No. 12, 1931, 1st Journey, footnote 17.

an 't/gebergte van de Sand-rivier, en van de Inwoonders/Samoe genaemt : Den 4 Novemb : 1685.

This plant was found in sandy places, the fruit thereof, which is tripartite and enclosed as in a bladder, like the Alkekengi*, has a bitter and astringent flavour, whose properties are as yet unknown, was found on the mountains near the Sand River, and called by the inhabitants Samoe ; 4 November, 1685.

[N.L.B.] Arbor Ingae Brasilianae foliis Africana tricoccos, fructu Nehebethene Cortusi Clusio accedente Pluken. Phyt. Tab. 144, Fig. 2.

Ingae folio capensis, fructu triangulo, tricocco. Petiv. Gazoph. Tab. 57, Fig. 1.

T.C.D. has " . . . . syn vrught bestaat in drien en is gelyck de Alkekengi in een *claas* besloten . . . . " [ital. mine], which Waterhouse translates : " Its fruit grows in threes and is in one *class* with the Alkekengi." A glance at the picture of the triloculate, *bladder*-like fruit shows that Waterhouse has misread the original text.

FOL. 61, numbered 52. (=T.C.D. 859). Plate IV.

b. (=T.C.D. 860).

Dese Convolvulus Spinosus is een soorte van Ezula,/geest een seer scherpe corrosive melk van hem, word/gevonden an Steenagtige plaatsen langs de Olÿ-/phants-rivier, den 20$^{e}$ Septemb$^{r}$ 1685.

This spiny Convolvulus is a kind of Ezula, exudes a very sharp corrosive milk [latex], found in stony places along the Olifants River, 20th September, 1685.

[N.L.B.] Volubilis Africana fructu tetragono, Smilaci similis, viticulis aspera, foliis medio aculeatis, & in capreolatum mucronem circumvolutis. Pluken. Phyt. Tab. 236, Fig. 6. cujus haec est varietas.

Smilax capensis fructu trigono, folio viticulo terminante. Petiv. Gazoph. Tab. 58, Fig. 4.

FOL. 63, numbered 53. (=T.C.D. 799). Plate VI.

b. (=T.C.D. 800). Plate XII.

Aloë Arborescens. Dese vreemde Aloë-boom, wiens stam/

* French : Alquequanges,=*Physalis*. See : Dodonaeus, p. 810*a*. R. Dodoens (Dodonaeus) 1517-1585.

*Cruÿdtboeck van Dodonaeus, met Beschrijvinge van de Indiaensche . . . . . Boomen . . . . die van Dodonaeus niet vermaent oft niet beschreven . . . .* [van C. Clusius]. Leyden, 1608.

A copy of this book is in the Koopmans de Wet Museum, Cape Town.

altemets boven 2 vaam in de rondte is, geest een/schoon helder sap, en in groote menigte, waer uÿt het/Gummi Aloës seer schoon in abundantie soude kun-/nen gemaect werden, de schors van de boom is vrÿ/hard, maer het binnenste is geheel Spongieus en/ligt. Uÿt dese boom vervaerdigen de Inwoonders haer/Pÿlkokers, want een tak daer af, van bekwame dicte,/hollen sÿ uÿt, dat niet daer an blÿvt als de schorse,/dewelke seer hard en taeÿ is, en op de eene sÿde trec-/ken sÿ een stuk leer daer over, als dan is de koker/vervaerdigt. De Inwoonders noemen dese boom Choje,/en is gevonden den 15 Octob : 1685.

Aloe Arborescens. This strange Aloe-tree, whose stem is often over 2 fathoms in circumference, exudes a nice clear sap in large quantities, from which Gummi Aloes could be made very easily in abundance, the bark of the tree is hard, but the inside is throughout spongy and light. From this tree the inhabitants fashion their quivers, they break off a branch of suitable thickness, hollow it out so that only the bark remains, which is very hard and tough, draw a piece of leather over one end, and the quiver is finished. The inhabitants call this tree Choje, and [it] was found 15 October, 1685.

[N.L.B.] Aloë Spinosa arborescens ramosa, Promontorii Bonae Spei. Pluk. Phyt. Tab. 129, Fig. 4.
Aloe capensis arbor ramosa. Petiv. Gazoph. Tab. 87, Fig. 9.

S.A.P.L. B23 has a Dutch description almost the same as S.A.M. with only slight verbal differences, e.g. " . . . waar uÿt de gom aloe seer schoon in abundantie . . . " ; also " light " in place of " ligt."

FOL. 65, numbered 54. (=T.C.D. 845). Plate VI.

b. (=T.C.D. 846).

Dit is de twede soorte van Aloë Arborescens, an/bladeren en vrugt met de andere over-een-ko-/mende, heeft ook bÿ de Inwoonders deselve bÿna-/minge, is gevonden den 30 Octob : 1685.
This is the second kind of Aloe Arborescens, resembling the other in leaves and fruit, also called by the same name by the inhabitants, found 30 October, 1685.

[N.L.B.] Aloe caulescens foliis reflexis, margine spinosis Africana. Pluken. Phyt. Tab. 129, Fig. 3.
Aloe capensis, arbor non ramosa. Petiv. Gazoph. Tab. 88, Fig. 3.

FOL. 67, numbered 55. (=T.C.D. 849). Plate IV.

a. Tachard has one bent and 2 straight leaves like S.A.M., but reversed, flower-stalk uncut but not projecting beyond the leaves.

b. (=T.C.D. 850).

Dit gewas groeÿt bÿ de 4 of 5 voeten hoog op Steen-agti-/ge plaatsen, de steel aldernaest de wortel is vervult/met een groote menigte soet-agtig schlÿm, word van de/inwoonders als haer de dorst plaegt gekaut, en 't sap/uÿtgesogen, heeft een wonderlÿke kragt om den mond/te ververschen, en te verkoelen, wast op diversche plaatsen/ word van de Inwoonders genoemt Gambrÿ, en is ge-/vonden den 12 Septemb : 1685.

This plant grows 4 or 5 feet high on stony places, the stem next the root is filled with a large quantity of sweetish juice, chewed by the inhabitants when suffering from thirst, and the juice sucked out has a wonderful power of freshening and cooling the mouth, grows in various places, called Gambry by the inhabitants, found 12 September, 1685.

[N.L.B.] Ornithogalum Africanum luteum odoratum, foliis cepaceis radice tuberosa. H. Leid. page. 466.
Pluken. Almag. pag. 272, male : nam est.
Ephemerum Phalangoides erectum, foliis liliaceis, bulbosum, flore flavescente, Capitis Bonae Spei. Pluken. Phyt. Tab. 174, Fig. 6.
Ornithogalum flavescente flore. Petiv. Tab. 87, Fig. 6.

FOL. 69, numbered 56. (=T.C.D. 833). Plate IV.

a. Tachard has 3 fruits, but is not quite like either S.A.M. or T.C.D.

b. (=T.C.D. 834).

Dese Heester word gevonden in 't land der Namaqua/op klip en sand-agtige plaatsen, brengt voort een an-/gename vrugt, an gedaente enigsints, maer an smaek/ten eenemael de Indiaensche Vrugt Kauki gelÿkende, is seer stoppende, en heeft die-gene, die alteveel daer/af eet, ligtelÿk eenig ongemak van hardlÿvrigheÿt te/verwagten, word van de Inwoonders Kannobe genoemt. Den 15 Octob : 1685.

This shrub is found in the country of the Namaquas on stony and sandy places, bears a pleasant fruit, at least in appearance, but in taste quite like the Indian fruit Kauki*, is very constipating, and those who eat too much of it may well expect to suffer from

*Kaki, the Indian name for the Persimmon (*Diospyros kaki*). Same family (*Ebenaceae*) as *Royena*. [Editor.]

obstruction, called Kannobe by the inhabitants. 15 October, 1685.

[N.L.B.] Cerasus Africana, fructu rubro simplici, folio breviore monococcos. Pluken. Phyt. Tab. 158, Fig. 5.
Cerasus capensis fructu rubro singulari. Petiv. Tab. 87, Fig. 12.

FOL. 71, numbered 57. (=T.C.D. 865). Plate VI.

a. Fruits coloured scarlet.

b. (=T.C.D. 866).
Dese Heester groeÿt an veele dorre en sandige plaatsen,/draegt een soorte van kerssen, aangenaem en wat rinsch/van smaeck, gesond en verkoelende, komende de reÿsende/en van dorst smagtelose menschen, om haren mond te/ververschen en dorst te lesschen seer wel te pas. word/bÿ de Inwoonders genaemt Cargoe, gevonden den 12e/Septemb : 1685.
This shrub grows in many barren and sandy places, bears a kind of cherry, pleasant and somewhat acid in flavour, healthy and cooling, very useful to travellers and others with parched tongues to freshen the mouth and quench thirst, is called by the inhabitants Cargoe, found 12th September, 1685.

[N.L.B.] Genisto-Spartium bacciferum Ericae foliis Africanum. Pluken. Phyt. Tab. 185, Fig. 6.
Spartio affinis Baccifera Ericae folio. [sc. Petiv.] Tab. 83, Fig. 9.

T.C.D. has ". . . . die de gesonde verkoelt . . . ", translated as " cooling to a healthy man." The S.A.M. version is far more sensible.

FOL. 73, numbered 58. (=T.C.D. 839). Plate IV.

a. Tachard very similar to S.A.M., reversed, with veined leaves, and flowers carefully drawn (even more artistically and less conventionally than in T.C.D.).

b. (=T.C.D. 840).
Dit welriekende bloemtien, komt voort uÿt een kleÿn/bolleken, 't welk als het in de assche gebraden, soet en/angenaem van smaeck is, dient an de Inwoonders voor/een ordinarie kostjen, en word van kaer gent Chabÿ/gevonden den 9 and 10 Septemb : 1685.
This pleasant-smelling flower grows out of a small bulb, which when baked in the ashes has a sweet and pleasant flavour, is a common food of the inhabitants and is called by them Chaby, found 9 and 10 September, 1685.

[N.L.B.] Hÿacinthus spicatus stellatus, floribus incarnatis, caule

& folio Orchidis ex Promontorio Bonae Spei. Pluken. Phyt. Tab. 195, Fig. 4.
Ornithogalum spicatum flore incarnato. Petiv. Gazoph. Tab. 85, Fig. 3.
[A later entry in blacker ink may perhaps be in the handwriting of N. L. Burman, filius :]
Melanthium ciliatum Thunb. et Linn. (?).
Thunb. Diss. Acad. v. 2. p. 396. Linn. Suppl. Plant. p. 213. Syst. Veget. xiv. p. 349 per Gmel. p. 587.

Cf. T.C.D. 786 which has very similar text with the same native name and date 10th September ; whereas T.C.D. 840 is mostly different and with date 13th September.

FOL. 75, numbered 59. (=T.C.D. 787). Plate VI.

a. Apparently a circular white flower surrounded by 8 projections resembling sepals. T.C.D. gives the same impression, but has only 6 projections. S.A.P.L. B27, however, shows that these projections were intended to represent ordinary leaves.

b. (=T.C.D. 788).
Dit is de :/: van de Namaqua en ook andere volken/alhier :/: beroemde Kanna, dewelke sÿ dagelÿx, gelÿk/de Indianen den Areek, in de mond dragen en knauen,/en die sulx veel doen, konnen gemakkelÿk daer af/dronken worden, is bÿ haer in grote aestime, gelÿk/alle dingen, dewelke de geesten van het hooft cor-/rumperen, en dronken maken : En datter eenige bÿ-/sonderheden in dese plante zÿn, blÿct niet alleen/uÿt hare werkinge, maer ook haer angename en/Cordiale smaek, word nergens gevonden als alleen op eenige/bergen der Lands der Namaquas en in Octob : ingesa-/melt ; gevonden den 20 Octob : 1685.
This is the—among the Namaquas and other local tribes—far-famed Kanna, which they habitually carry in the mouth and chew, as do the Indians the Areca [Betel-nut], and as it easily makes them drunk if they take much of it, it is much esteemed by them, like all things which corrupt the senses and inebriate. And that there are several peculiarities in this plant is shown not only by its effects, but also by its pleasant and cordial taste ; was found only in certain mountains in the country of the Namaquas and collected in October ; found 20th October, 1685.
[N.L.B.] Bellis ramosa umbellifera Cornuti Pluken. Phyt. Tab. 150, Fig. 3. Bellis major ramosa umbellifera Americana. Parkins. male scriptum nam est.
Bellis Mÿrtifolia humilis cauliculo ad florem folioso

Promon. Bonae Spei. Pluken. Phyt. Tab. 150, Fig. 2.
Petiv. Gazoph. Tab. 83, Fig. 10.

FOL. 77, numbered 60. (=T.C.D. 837). Plate VI.

a. S.A.M. very similar to T.C.D. Tachard, reversed, is almost exactly like S.A.M.

b. (=T.C.D. 838).
Een vreemde onbekende soorte van Ezula Arborescens,/wast op sommige steenagtige plaatsen van de Olÿ-/phants-rivier, gevonden den 4e Janÿ 1686.
A strange unknown kind of Ezula Arborescens, grows in some stony places near the Olifants River, found 4th January, 1686.
[N.L.B.] Apocÿnum tuberosum angustifolium erectum flore ex luteo virescente, folliculis pubescentibus Africanum Pluken. Phyt. Tab. 137, Fig. 6.
Apocÿnum barbatum fere triphÿllium Petiv. Gazoph. Tab. 84, Fig. 3.

FOL. 79, numbered 61. (=T.C.D. 819). Plate IV.

b. (=T.C.D. 820).
Dese Heester brengt voort een soort van wilde bessen,/eenigsints bekwaam om te eeten, maer seer onbekwaam/en ongesont voor de Maagh, want deselve groote/pÿn in de buik veroorsaken, voornamentlÿk als men/veel daer af gegeten, en eenig water daer op gedron-/ken heeft, word an vele plaatsen gevonden, en van de Inwoonders Thou genaamt, gevonden den 3 Sept :/1685.
This shrub produces a kind of wild currant, pleasant to eat but very unpleasant and unhealthy for the digestion because it causes great pain in the stomach, especially when one has eaten much of it and thereafter drunk water, was found in many places and called by the inhabitants Thou, found 3 September, 1685.
[N.L.B.] Cerasus Africana, foliis plerumque in summo sinuatis, fructu rubro. Pluken. Phyt. Tab. 158, Fig. 2.
Cerasus Capensis fructu rubro, folio fere obtuso Petiv. Gazoph. Tab. 57, Fig. 4.

FOL. 81, numbered 62. (Not in T.C.D.). Plate VI.

b. Dese eetbare en soete wortel word gevonden in sommi-/ge valleÿen lange de picketberg, hebben vermits het nog/te vroeg was, de bloeme niet kunnen bekomen.
This edible and sweet root was found in some valleys along the

Picket Berg, but being too early in the season, we could obtain no flowers.

FOL. 83, numbered 63. (Not in T.C.D.). Plate VI.

a. Burman's figure closely resembles S.A.M., but has only 7 bracts at base of flowers instead of 8. This is one of the more painstakingly executed pictures in S.A.M.

b. Species Dauci seer angenaem van reuk, is een/kostelÿk carminativum, wast op dorre sandige plaat-/sen in 't land der Grigriquas, gevonden den 9 Septemb :/1685.
A species of Daucus [carrot] with very pleasant smell, is a valuable carminative, grows on barren sandy places in the country of the Grigriquas, found 9 September, 1685.
[N.L.B.] Apium foliolis trifidis, dentatus Burm. Dec. pl. Africa. p : 198. Tab. 72, Fig. 2.
Burman says " Flores . . . . quae minus feliciter a pictore in Figura *Wits.* expressa sunt, habetur autem in *Codic. Wits.* tanquam Dauci species jucundi odoris, virtutis carminantis, quae . . . . " etc. as in S.A.M., but with date 7th instead of 9th September.

FOL. 85, numbered 64. (=T.C.D. 869). Plate VI.

a. Burman's illustration, reversed (though with section of tuber on right), is a close copy of S.A.M., leaves not so bunched together. In S.A.P.L. B25 the flowers are crimson.

b. (=T.C.D. 870).
Een soorte van Geranium, met een soete en eetbare wor-/tel, bÿ de inwoonders seer in gebruik, word an diversche/plaatsen gesien en van de Namaquas Heÿntame, en van/de Grigriquas Aree gen$^{t}$ gevonden den 24 7b : 1685.
A kind of Geranium with a sweet and edible root, much used by the inhabitants, was seen at various places, called by the Namaquas Heÿntame, and by the Grigriquas Aree, found 24th September, 1685.
[N.L.B.] Geranium Africanum noctu olens, flore rubro, Anemones folio angustiore. Pluken. Phyt. Tab. 186, Fig. 6, &c. Geranium radice Rapacea, flore sanguineo Petiv. Gazoph. Tab. 84, Fig. ii [=eleven, see Burman, p. 91]
Pelargonium rapaceum, foliis ternis trilobatis & tridentatis flore sanguineo. Burm. Dec. pl. Afric. p. 91, Tab. 35, Fig. 2.

FOL. 87, numbered 65. (Not in T.C.D.). Plate VII.

a. Burman's figure, reversed, is a very close copy of S.A.M., the lowermost leaf on stem bent round evidently to avoid conflicting with

the neighbouring illustration. " Haec planta in *Cod. Wits.* eleganter depicta habetur . . . . " and he gives a literal latin translation of the S.A.M. text. The word " eleganter " is well merited, as the picture is one of the best in the S.A.M. volume.

b. Dit onbekent gewas komt voort op dorre sandige plaat-/sen, is angenaem van reuk, en kan wel onder de plantas/Chephalicas gereeckent werden ; gevonden den 12 Septemb :/1685.
This unknown plant grows on barren sandy places, has a pleasant scent, and can well be reckoned as one of the plantae Chephalicae ; found 12th September, 1685.
[N.L.B.] Lÿchnidea foliis ad radicem ternis obpositis, ad caulem solitariis alternis, floribus umbellatis Burm. Dec. pl. Afric. p. 142. Tab. 50, Fig. 3.

FOL. 89, numbered 66. (Not in T.C.D.). Plate VII.

a. Burman's figure, reversed, is a faithful copy of S.A.M., with engraver's embellishments such as venation of leaves.

b. Species Pensees, wast an veele sandige plaatsen, langs/de Bergrivier, gevonden den 1 7b : 1685.
A species of Pansy, grows in many sandy places along the Berg River, found 1 September, 1685.
[N.L.B.] Vide supra Fig. 47, cujus species est haec planta. Pinguicula foliis obpositis, floribus corniculatis. Burm. Dec. pl. Afric. p. 106. Tab. 40, Fig. 3.
[L. Pappe] Nemesiae species.

FOL. 91, numbered 67. (Not in T.C.D.). Plate V.

a. Burman's figure is a close copy of S.A.M., slightly improved by the engraver. Burman says : " Ex *Cod. Wits.* hanc plantam producimus . . . . de qua dicitur . . . . " with literal translation of the S.A.M. text.

b. Dese Heester van een soetenreuk, bekwaem tot stovingen,/in coude contracturen te gebruicken, gevonden den 12e/Septemb : 1685.
This shrub with a sweet scent, " apta pro cataplasmate in frigidis contracturis " [Burman], found 12th September 1685.
[N.L.B.] Chrÿsanthemoides fruteseens, foliis profunde laciniatis & acutedentatis. Burm. Dec. pl. Afric. p. 167. Tab. 60, Fig. 3.

FOL. 93, numbered 68. (=T.C.D. 823). Plate VIII.

a. S.A.M. simpler than T.C.D., only 6 leaves and one bunch of 4 fruits,

and veining of leaves not so carefully done.

b. (=T.C.D. 824).
Dese boom komende tot een tamelÿke lengte, is wel/de grootste omtrent de Gewesten der Grigriquas en/Namaquas, hÿ draegt een soorte van bessen, van binnen/vervult met eenig saad, bitter zÿnde, word seer gesogt/van de Vogelties derhalven dese bomen, altÿd met on-/telbare menigte van vogel-nesties, gelÿk als met eenige/ vrugten behangen, komen te pronken, word gevonden an/de Olÿphants-rivier den 15 Septemb : 1685.
This tree, reaching a moderate height, is the largest in the district of the Grigriquas and Namaquas, it bears a kind of berry filled with some seeds, bitter, much sought after by birds, in consequence of which these trees are always ornamented with countless numbers of birds' nests, as if festooned with fruits ; was found at the Olifants River 15 September, 1685.
[N.L.B.] Cerasus Africana racemosa, fructu rubro absque pediculis folio longiore & latiore. Pluken. Phyt. Tab. 157, Fig. 3. Cerasus Capensis fructu rubro racemosa. Petiv. Gazoph. Tab. 87, Fig. 10.

FOL. 95, numbered 69. (=T.C.D. 797). Plate V.

a. Bulb, with rootlets, and 2 upstanding bracts at base of the short stalk. T.C.D. having no rootlets looks more like a fruit, and was identified at Kew as "*Solanum* sp. fruit." Waterhouse could have prevented this somewhat egregious mistake by submitting, with the photograph of the picture, a copy of the accompanying text in which the object is stated to be a bulb. S.A.P.L. B36 also has no rootlets.

b. (=T.C.D. 798).
Dese wortel of bolle van een soete en angename smaek,/wast op sandige grond, hebben varmits het laet in 't jaer waer, de gedaante van hare bladeren en bloemen niet/kunnen bekomen, word van de Inlanders Haro gen$^{t}$/gevonden den 1 Decemb : 1685.
This root or bulb with a sweet and pleasant flavour grows on sandy ground ; owing to its being late in the year we could not obtain sight of the leaves and flowers, called by the inlanders Haro, found 1 December, 1685.

FOL. 97, numbered 70. (=T.C.D. 841). Plate VII.

b. (=T.C.D. 842).
Dit aensienlÿk gewas, 't welk altemets boven een/mans lengte uÿtwast, is een vremde soorte van/Ezula, word op vogte plaatsen

gevonden, dog seer/selden ; Dese plante is agter den Steenberg van den/Ed : H^r^ Commandeur op den 30 Janÿ 1686 gevonden.
This fair-sized plant, which may often exceed a man's height, is a strange kind of Ezula, was found in damp places, but very seldom ; this plant was found at the back of the Steenberg by the Hon. Commander on 30 January, 1686.

[N.L.B.] Apocÿnum Africanum tuberosum, latiore folio erectum, folliculis hirsutis, flore pallida punicante. Pluken. Phyt. Tab. 139, Fig. 1.
Apocÿnum Capense Lauri folio venoso, fructu barbato. Petiv. Gazoph. Tab. 84, Fig. 1.

This picture does not actually belong to the collection made on the Namaqualand expedition as the plant was found after van der Stel returned. The Steenberg plateau lies south of Constantia (Simon van der Stel's estate) and west of Muizenberg. Behind it is the Silvermine valley, and possibly van der Stel was visiting the (alleged) silver mine when he found the plant.

FOL. 99, numbered 71. (=T.C.D. 807). Plate VIII.

a. S.A.M. and T.C.D. are obviously representations of the same kind of plant, but there is no great similariy in arrangement of the leaves etc. No seed shown separately in S.A.M.

b. (=T.C.D. 808). Plate XII
Dese bomen waer uÿt meest alle bosschagien des ge-/heelen Namaquaschen Lands bestaen, word van ons :/: mits/de veelheÿt van sÿn schadelÿke doornen :/: een doorn-boom,/ en van de Inwoonders Choe genoemt, wast op tot een brave/groote, is goed hard en bekwaam hout, maer valt door de/bank vrÿ wat krom, dese bomen werden nergens gevonden,/als alleen waer eenig boven of onderaardsche rivier loopt,/hoe kleÿn het ook wesen mag, de bloemen zÿn van een/uÿtstekende angename reuk, na deselve volgt een bone,/waer in eenig pitagtig saed gevonden word. Derselver/kragt en werkinge is tot nog toe onbekend. In 8b : 9b :/en 10b : 1685 gevonden.
This tree, of which almost all the wooded areas in the whole of Namaqualand consist, was called by us—on account of the quantity of dangerous thorns—a thorn-tree, and by the inhabitants Choe, grows to a goodly size, is good hard and useful wood, but of a somewhat crooked grain ; these trees are never found except where a surface or underground stream runs, however small it may be ; the flowers have an outstanding pleasant scent, after them follows

a bean in which are found a few pip-like seeds. Their properties and effects are still unknown. Found in October, November and December, 1685.

[N.L.B.] Acacia Africana Abruae folio aculeata, spinis longissimis horrida. Pluken. Phyt. tab. 123, Fig. 2. forte.
Acacia Americana spinosissima, floribus luteis, globosis, fructu tenui toroso dulci. Breÿn. Prodr. 2.

FOL. 101, numbered 72. (=T.C.D. 791). Plate VII.

b. (=T.C.D. 792).

Dese soorte van Carduus wast op den Dassenbergh, ge-/vonden den 14 Septemb : 1685.
This kind of Carduus [thistle] grows on the Dassieberg, found 14 September, 1685.

[N.L.B.] Carlina Chrÿsanthemos Africana humilis. Pluken. Phyt. Tab. 154, Fig. 6. Carlina Chrÿsanthemoides flore luteo Capitis Bonae Spei. Breÿn. Prodr. 2.
Carlina Capensis, Pilosellae foliis. Petiv. Gazoph. Tab. 82. Fig. 10.

FOL. 103. numbered 73. (=T.C.D. 863). Plate VII.

b. (=T.C.D. 864).

Citisus Arborescens met purperagtige bloemen, gevonden/den 12 Septemb : 1685.
Cytisus [broom] Arborescens with purple flowers, found 12th September, 1685.

[N.L.B.] Anagÿris Africana angustis siliquis, flore coeruleo. Pluken. Phyt. Tab. 133, Fig. 5.
Anagÿris Capensis flore coeruleo. Petiv. Gazoph. Tab. 83. Fig. 8.

FOL. 105, numbered 74. (=T.C.D. 831). Plate VII.

b. (=T.C.D. 832).

Dese woitel wast op vogte en moerassige plaatsen, is van/een soete en angename maer wateragtige smaek, is be-/kwaem om voor een dagelÿx kostje voor de Hongerige Hot-/tentots te verstrecken, wast op sommige plaatsen van het/Land der Namaquas, en van haar berroe genoemt, gevonden/den 27 Septemb : 1685.

This root [tuber] grows in damp and marshy places, has a sweet and pleasant but watery flavour, is easy for the hungry Hottentots to obtain for their daily food, grows in some places in the country

of the Namaquas and by them called berroe, found 27 September, 1685.

[N.L.B.] Brÿonia Sideritidis folio multiplici dispermos, flore coeruleo Promontorio Bonae Spei. Pluken. Phyt. Tab. 152. Fig. 1.
Apocÿnum tuberosa radice, scandens. Petiv. Gazoph. Tab. 84, Fig. 4. [This reference cancelled]. Brÿonioides Capensis bulbosa, flore coeruleo, dispermos. Petiv. Gazoph. Tab. 82, Fig. 12.

FOL. 107, numbered 75. (=T.C.D. 853). Plate VII.

b. (=T.C.D. 854).
Dit gewas van reuk en bladeren gelÿct te zÿn een soorte/van Stoechas, de wortel daer van is van een sterken an-/genamen „Chephalischen" reuk, word genoemt van de Inboorlingen Doucuma/[Chephalischen between the lines].
This plant from its smell and leaves appears to be a kind of Stoechas [=*Helichrysum*], its root has a strong and pleasant Chephalic smell, is called by the inhabitants Doucuma.

[N.L.B.] Chrÿanthemum Africanum ad radicem Umbelliferarium more, comosum. Pluken. Phyt. Tab. 160, Fig. 4.
Chrÿanthemum Capense, folio oblongo. Petiv. Gazoph. Tab. 81, Fig. 8.

FOL. 109, numbered 76. (=T.C.D. 793). Plate VIII.

b. (=T.C.D. 794).
Dit gewas wiens wortel en stam uÿt een brosse sub-/stantie sonder onderscheÿd, werd gevonden op veele plaet-/sen der Namaquas, de Stam met de wortel an 't vier/gebraden is angenaam om te eeten, word bÿ de Nama-/quas als een gemeen kostje 't geheele Jaer lang gege-/ten, en van haer Thumma genaamt, gevonden de 30 7b$^{r}$ 1685.
This plant, whose root and stem without differentiation consist of a brittle substance, was found in many places in the country of the Namaquas, the stem and root when roasted on the fire is pleasant to eat, is eaten by the Namaquas as a common food all the year round, and called by them Thumma, found 30 September, 1685.

[N.L.B.] Alsine carÿophÿloides Africana, radice magna Astragalite Pluken. Phyt. Tab. 128, Fig. 4.
Bermudiana Capensis, radice magna, carnosa. Petiv. Gazoph. Tab. 57, Fig. 7.

FOL. 111, numbered 77. (=T.C.D. 817). Plate VIII.

a. The fruits are coloured bright scarlet, not " brown-red."

b. (=T.C.D. 818).

Een soorte van wilde aspergies, met bruÿn-rode bes-/jes, gevonden den 6 Septembr 1685.

A kind of wild asparagus, with brown-red berries, found 6 September 1685.

[N.L.B.] Asparagus sive Cornuda sylvestris Africana, aculeata, foliis pennas avium referentibus nobis.
Frutex Capensis baccifer spinosus, foliis pennas avium referentibus. Pluken. Phyt. Tab. 184, Fig. 1.
Asparagus Capensis spinosa, foliis fere ternis plumosis Petiv. Gazoph. Tab. 57, Fig. 6.

FOL. 113, numbered 78. (=T.C.D. 825). Plate VIII.

b. (=T.C.D. 826).

Dese wortel wast op vogte en sandige grond, word bÿ de Inwoonders in groote astime gehouden, ende van haer gegeten om het water aftesetten, en ook niet sonder redenen, want deselve een soorte van brionia/te zÿn ondervonden is, word op veele plaetsen deses/lands, maer insonderheÿt tusschen de Olÿphants en doornbosch rivier gevonden, en van de Namaquas/Camarebi, en van de Grigriquas Camao genoemt,/van ons gevonden den 27 7b : 1685.

This root grows on moist and sandy ground, is held in great esteem by the inhabitants, is eaten by them as a diuretic, and not without good reason, because it has been found to be a kind of Bryony, was found in many places in this country but especially between the Olifants and Doornbosch rivers, called by the Namaquas Camarebi, and by the Grigriquas Camao, found by us 27 September, 1685.

[N.L.B.] Apocÿnum scandens radice tuberosa Promontorii Bonae Spei Pluken. Phyt. Tab. 138, Fig. 4.
Apocynum scandens tuberosa radice. Petiv. Gazoph. Tab. 84, Fig. 4.

In the Dutch text the original spelling was " brionia " ; a ÿ has been written with a different pen, and ink, over the first i.

FOL. 115, numbered 79. (=T.C.D. 829). Plate VIII.

b. (=T.C.D. 830).

Gladiolus Esculentus, gevonden den 10 en 11 7br 1685.

Gladiolus esculentus, found 10 and 11 September, 1685.

[N.L.B.] Sisÿnrichium viperatum Capitis Bonae Spei Pluken. Phyt. Tab. 224, Fig. 8.
Sisynrichium Capense, monanthos, flore cucullato. Petiv. Gazoph. Tab. 58, Fig. 2.

FOL. 117, numbered 80.. (=T.C.D. 789). Plate VIII.

b. (=T.C.D. 790).

Dit gewas word gevonden in de laagten omtrent/Meÿerhofs Casteel, de wortel is volgens verhaal der/inwoonders purgerende en word altemets in dese ge-/legenheÿt met goed succes gebruict, word van de/Namaquas en Grigriquas Qua-roebe genoemt.

This plant was found in the neighbourhood of Meyerhofs Casteel, the root is according to the inhabitants purgative and is always used in such cases with good success, called by the Namaquas and Grigriquas Qua-roebe.

[N.L.B.] Hÿacinthus Africanus Orchioides diphÿllas, flore croceo, Colchici fritillarici foliis undatis, capsula inflata.
Pluken. Phyt. Tab. 195, Fig. 6.
Petiv. Gazoph. Tab. 87, Fig. 7.

Described by Petiver as "Comptonia Capensis lutea, trifoliata, crispa" in honour of Bishop Compton.

FOL. 119, numbered 81. (=T.C.D. 827). Plate VII.

b. (=T.C.D. 868).

Dese soorte van Geranium met een welriekende/bloeme, werd gevonden an de Berg-fonteÿn en das-/senberg, heeft een brosse en murwe stam, en is soet/en angenaem van smaek, word van de Inwoonders/gegeten ende genaamt Cabouti; gevonden den 13 7b : /1685.

This kind of Geranium with a sweet-scented flower was found at Bergfontein and Dassieberg, has a brittle and soft stem and a sweet and pleasant flavour, is eaten by the inhabitants and called Cabouti, found 13 September 1685.

[N.L.B.] Geranium Africanum noctu olens, Aquilegiae folio, flore incarnato rubente. Pluken. Phyt. Tab. 187, Fig. 1.
Geranium Capense Carÿophÿllatae foliis, caudice spinoso. Petiv. Gazoph. Tab. 84, Fig. 8.

S.A.P.L. B15 has crimson flowers. The text reads: Geranium columbinum met schone rode Bloemen, word gevonden omtrent de bergfontein. Cf. S.A.M. fol. 57 (50).

FOL. 121, numbered 82. (=T.C.D. 851). Plate VIII.

b. (=T.C.D. 852).

Dese seer rare Esula, welke een soorte van Euphorbium/schÿt te wesen, word omtrent de minerale bergen, tus-/schen hoge klippen gevonden, de melk of sap daer/uÿt word bÿ de inwoonders voor lÿm gebruict, om hare/kokers en pÿlen daer mede te lÿmen, en word van haer/Tkaubÿ genoemt, gevonden den 25 Octob : 1685.

This very rare Esula, which appears to be a kind of Euphorbium, was found among high rocks at the mineral [Copper] Mountains, the milk or sap thereof is used by the inhabitants as a gum to smear over their quivers and arrows, and is called by them Tkauby, found 25 October 1685.

[N.L.B.] Tithÿmalus Africanus spinosus, Cerei effigie. Pluken. Phyt. Tab. 231, Fig 1, &c.
Euphorbium Capense, Cerei effigie, spinosum. Petiv. Gazoph. Tab. 90, Fig. 2.

White, Dyer, & Sloane in *Succulent Euphorbieae*, vol. 2, p. 711 reproduce T.C.D. 851 and Plukenet's illustrations as figs. 796 and 797 respectively, showing that Plukenet wrongly inserted simple spines among the forked ones and thus altered the characteristics of the species.

FOL. 123, numbered 83. (=T.C.D. 847). Plate VII.

b. (=T.C.D. 848).

Dese Hoester wast op sandige grond, draagt een vrugt/angenaam om te eeten, maer geweldig asstringerende,/werd van de Nederlanders Baviaens kerse genoemt,/gevonden den 18 Janÿ 1686.

This shrub grows on sandy ground, bears a fruit pleasant to eat, but exceedingly astringent, called by the Netherlanders Baboons Candle, found 18 January, 1686.

[N.L.B.] Cerasus Africana fructu rubro multiplici folio longiore angusto. Pluken. Phyt. Tab. 158, Fig. 3.
Forte Cambuc Pernambucc : fruticescens. Jonst. Dendr. page. 243.
Cerasus Capensis, fructu rubro racemoso, pediculis perbrevibus. Petiv. Gazoph. Tab. 87, Fig. 11.

FOL. 128. (=T.C.D. 761). Plate IX.

a. Picture lengthwise on folio, beak pointing to head margin, feet to back margin. T.C.D. also has the peculiar elongation of the body, covered with small feathers, with the long tail feathers inserted

at the end, resembling the caudal peduncle of a fish. But S.A.P.L. Z14 is drawn without this prolongation.

b. (=T.C.D. 762).
Dese soorte van Tortelduifjes word gevonden doorgaans/in het gebergte van de Namaquas, en van haer ge$^{t}$/Chaboÿ den 18 Octob : 1685.
This kind of Turtledove was found throughout the mountainous country of the Namaquas, and called by them Chaboy, found 18 October 1685.
[E. L. Layard] *Œna Capensis* (Linn.).*
T.C.D. text says it was found on 10 October ; S.A.M. has distinctly 18.

FOL. 130. (=T.C.D. 759 upper fig.). Plate IX.

a. A crude picture, gives the impression of having been hastily done. Transverse on folio, beak facing back margin (left).

b. (=T.C.D. 760, text of lower figure).
Dese soorte van Tortelduiven word doorgaans in het/Land der Namaquas gevonden, en gelÿk de andere Que-/lip genoemt, van ons geschoten den 4$^{e}$ Novemb : 1685.
This kind of Turtledove was found throughout the country of the Namaquas, and like the other kind called Quelip, shot by us 4th November, 1685.
[E.L.L.] *Œna capensis* (Linn.).
The native name corresponds (quelip—queip) with the text pertaining to the lower figure in T.C.D., but the tail corresponds with that of the upper figure.

FOL. 132. (Not in T.C.D.). Plate XI.

a. (upper figure). Dorsal view of a beetle with plumose antennae, and elytra with tufts of fur like a *Julodes*.
(lower figure). Dorsal view of a beetle with bifurcate mandibles, and 8 pairs of legs ; elytra brown striped with black, with 3 white dots on each lateral margin. Unmistakably an *Anthia*.

b. Dese twee soorte van torren worden gevonden op diversche plaatsen omtrent/d'Olÿphants Rivier.
These two kinds of beetle were found at various places along the Olifants River.
[E.L.L.] 1. (blank). 2. *Anthia*.

* Identifications in pencil after the Dutch text are in E. L. Layard's handwriting. Footnote p. 14.

FOL. 134. (Not in T.C.D.). Plate XI.

a. (upper figure). A Nemopteron, long antennae, broad fore-wings, narrow elongate hind-wings, with oar-like apical expansions. Crudely drawn, but obviously a representative of the genus *Nematoptera*.

(lower figure). A Stick-insect. Very crude.

b. Een gevleugelde m$\ddot{y}$re gevonden in't Land der Namaquas/den 12 8 ber 1687 [7 sic].

Een soorte van Sprinckganen gevonden den 4 7ber.

A winged ant found in the country of the Namaquas 12 October 1687 [sic].

A kind of grasshopper found 4 September.

[E.L.L.] (upper) *Nemoptera*. (lower) *Bacillus*.

FOL. 136. (=T.C.D. 783). Plate XI.

a. (upper figure). In many respects (e.g. small eyes) a truer picture of the insect than T.C.D.

(lower figure). Similar to T.C.D., but the legs, especially the first 2 pairs larger proportionately to the body, first 2 pairs and the last pair of legs more profusely furry than in T.C.D., the last pair being furry to their very tips.

b. (=T.C.D. 784).

Dese Sprinklianen word doorgaans op de meeste/plaatsen gevonden, maar weinig, wird genaamd Garam/gevonden den 12 7 ber 1685. Dese Spinnekop synde ongemeen Gau in 't loopen,/word van de Inwoonderen voor ser veninig ja/doodely$\ddot{y}$k gehouden, word omtrend de minerale bergen/gevonden gnareb$\ddot{y}$ genoemd ; den 5 8ber 1685.

This grasshopper was found throughout most places, but in small numbers, is named Garam, found 12 September, 1685. This spider is uncommonly quick in running, is regarded by the inhabitants as very poisonous, yea deadly, was found round about the mineral [Copper] mountains, called Gnareby, 5 October, 1685.

[E.L.L.] (upper) *Hetrodes*. (lower) Probably meant for the *Galeodes* with densely tufted hind legs found in Little Namaqualand and adjacent districts.

T.C.D. text says the lower animal was found on 25th October. It seems strange that the British Museum arachnologist did not recognise the lower picture as representing a Solpuga.

Petiver, whose picture (Gazoph. Tab. lxxxv. Fig. 9.) is more like T.C.D., calls it the " Cape Feather-leggs. A very odd Insect."

FOL. 138. (=T.C.D. 781). Plate XI.

a. Apical appendages of upper millipede relatively longer than in T.C.D. The spider has 2 black dots not on the head but on the segment behind it, longer palps, 2 squarish yellow patches on hind margin instead of the median one in T.C.D.

b. (=T.C.D. 782).

Dese Spinnekop van een seer schoone namentlÿk goud/en silver Coleur zÿnde, word gevonden op sommige/plaatsen der lage landen der namaquas, word van haar/seer vergiftig g'oordeeld, en holop genoemd den 12 9ber/1685.

Dese twee soorten van duÿsendbenen, waar van de bovenste/ langs de Olÿphants rivier, de andere in de lage landen der/namaquas gevonden werden, en van deselve Coerequeque-/kam, en van de Grigriquas toucomqueri, den 18 Septemb :/1685 gevonden.

This Spider of a very pretty gold and silver colour was found in some places in the country of the Namaquas, is regarded by them as very poisonous, and called holop, 12 November 1685. These two kinds of Millipedes, of which the upper one was found along the Olifants River, and the other one in the country of the Namaquas, and by them called Coerequequekam, and by the Grigriquas toucomqueri, found 18 September, 1685.

[E.L.L.] *Argiope. Scolopendra.*

Petiver figures the *Argiope* on Tab. lxxxv. Fig. 10, as the Yellow Cape Tarantula.

FOL. 140. (=T.C.D. 779). Plate XI.

a. Similar to T.C.D., but both figures facing upwards.

b. (=T.C.D. 780).

Dese twe soorten van schorpioenen werden gevonden de eene/ langs en omtrent de Olÿphants rivier, de andere in 't land der/ Namaquas, dewelke de stek van dese worm voor dodelÿk/houden, word van de Inlandere eÿnte genoemd, gevonden den/19 7ber en 2 8ber 1685.

These two kinds of Scorpion were found one along and near the Olifants River, the other in the country of the Namaquas, who regard the sting of this creature [worm] as deadly, was called by the inhabitants eynte, found 19 September and 2 October, 1685.

[E.L.L.] *Scorpio.*

The upper figure is an *Opisthophthalmus*, though the tail is rather too thick ; the lower figure is a *Parabuthus*.

FOL. 142. (=T.C.D. 735). Plate IX.

a. The caterpillar is very crudely painted, black bands splashed with red, and black dots representing the metallic mosaic-like areas which are so much better (as regards draughtsmanship) expressed in T.C.D. The latter is also better in this respect than S.A.P.L. Z2. This Saturnid moth is now known as *Gonimbrasia tyrrhea.*

b. (=T.C.D. 736).

Dese soorte van Wilde Conÿnen word gevonden omtrent/de mineralebergen, is angenaam en lekker van smaak/en van de Inwoonders Nabasse genoemd, gevangen den 20 8ber/1685./Diese Rispe word doorgaans in 't land der namaquas gevon/den, en dit lelik schepsel moet dese menschen dienen voor een/bÿsondere delicatesse, want na dat sÿ haar de groene vuÿligheid/uÿt haar lÿv gedruct hebben, rÿgen sÿ deselve an houte speties/en als dan over de kolen geleid, tot dat sÿ beginnen hard/te werden, dan is het een lekker gebraad, maar als sÿ deselve/willen gekookt eeten, so havenen sÿ deselve gelÿk sÿ met de/groene en roode Sprinkhanen gevend sÿn te doen, namentlÿk/na dat sÿ de groovste vuÿligheid uÿt gedrukt hebben, doen/sÿ desclve in een aarden pot, sonder enig water, want so/ vroeg als deselve beginnen heet te werden, dan ontgaat haar/een gedeeldte water waar in sÿ naderhand, onder/'t continueel omroeren, een halv uir koken en smoren,/dan word de gehele masse uÿt genomen, en 't water schoon uÿt :/gedrukt en ballen daar van gemaakt waar van sÿ nader :/hand als haar den appetÿt ankomt met sodanig een smaak/haar harte komen op te halen, dat het waarlÿk een lust/omt sien is, en word van haar aroebe genoemd, gevonden/den 25 December 1685.

This kind of Wild Rabbit was found in the neighbourhood of the mineral [Copper] mountains, is of a pleasant and sweet flavour, and by the inhabitants called Nabasse, caught 20 October, 1685. This Caterpillar is found throughout the country of the Namaquas, and this nasty beast is a particular delicacy to these people, for when they have pressed the green ordure out of the body, they impale them on wooden spits and lay them over the embers till they begin to get hard, when they form a savoury roast ; but if they want to eat them boiled they treat them as they customarily do the green and red locusts, namely, after they have pressed out the coarsest ordure, they put them in an earthen pot, without any water, until they begin to get hot, when some green liquid comes out of them in which they next boil and simmer them, with constant stirring, for half an hour, then the whole mass is taken out, the water well squeezed out, and made into balls, which afterwards

when they have an appetite they consume with such gusto that it is a delight to watch ; called by them aroebe, found 25 December, 1685.

[E.L.L.] *Lepus crassicaudatus.* Larva of *Antheraea tyrrhea* Cram.

FOL. 144. (=T.C.D. 743). Plate X.

a. Picture lengthwise on folio, facing foot margin, belly facing front margin. Rather well drawn, at least as faithful a representation of the animal as T.C.D., the belly scales in fact more correct. Cf Tachard (1st Voyage) fig. xiii., and Petiver (Gazoph.) pl. lviii, Fig. 12.

b. (=T.C.D. 744).

Dese vervaarlÿke worm sÿnde een soorte van hagedissen/is doorgaans over sÿn lÿv met dikke schubben gelÿk als met/een harnas bekleed, is seer boosardig en weet sÿn Ligaam/met ser vinnig om sig te bÿten wel te beschermen, van ons/gekregen an d'eerste modderkuÿl, word van de Inboorlinge/thocou genaamd.

This fearsome creature [worm] appears to be a kind of lizard, has its whole body covered with thick scales like a harness, is very vicious and knows well how to protect its body by very quick bites, obtained by us at the First Mudhole, is called by the inhabitants thocou.

[E.L.L.] *Cordylus* ? *giganteus* A. Smith or *cataphractus* Dum. & Bib.

The First Mudhole is north of Koekenaap (Journ. Olaf Bergh. Van Riebeeck Soc. Public. No. 12, p. 107, footnote 24, and map).

FOL. 146. (=T.C.D. 775). Plate X.

a. Both pictures are left side views, lengthwise on folio, heads facing foot margin. Upper picture more crude than T.C.D., thicker in proportion to length and consequently appearing more like a Berg Adder. Possibly a young Mole Snake (*Pseudaspis cana*). Lower picture very crude, has a broad blue stripe along back, a thin one along the side, and without the series of dots as in T.C.D., which make the latter resemble a Legless Lizard (*Acontias*).

b. (=T.C.D. 776).

Een slange van een bonte en angename koleur, niet boven/een en een halve voet lang, word van d'Inwoonders seer/boos en veninig gehouden, en van de namaquas/thoumquete en van de grigriquas Eÿterimate genoemd,/van ons gesien den 6 September 1685.

Dese gehel kleine soorte van slangen word gevonden in 't /land der

Namaquas, en van haar genoemd noumqueab/van de grigriquas Choem, gesien den 2 October 1685.

A snake of a bright and pleasing colour, not over a foot and a half long, is considered by the inhabitants very poisonous, called by the Namaquas thoumquete and by the Grigriquas Eyterimate, seen by us 6 September 1685.

This quite small kind of snake was found in the land of the Namaquas, and by them called noumqueab, by the Grigriquas Choem, seen 2 October 1685.

FOL. 148. (=T.C.D. 773). Plate X.

a. Left side view, lengthwise on folio, head facing head margin. Very roughly executed. Blackish-brown.

b. (=T.C.D. 774).

Dese slange altemets an lengte boven de 7 a 8 voeten/halende, en vervaarlich om an te sien, word van de Sunquas/met groote graagheid gegeten, en voor seer lekker gehouden,/bÿ haar genoemd krÿ̈karas, en bÿ̈ de Caapsche Cabcou word/overal gevonden, den 6 October 1685.

This snake often reaching a length of over 7 or 8 feet and of dangerous appearance, is eaten with great relish by the Sunquas and considered very excellent, called by them krykaras, and by the Cape people Cabcou, is found everywhere, 6 October, 1685.

The name krykaras in the Dutch text can be read as krÿ̈ or keÿ̈ . . . , as the letter e is written in three different ways in the 5 lines of text. It seems most likely to be intended for an e, especially as T.C.D. has keÿ̈karas.

In Waterhouse the British Museum suggested Mole Snake with a ? for this picture. There is no doubt that this identification is correct.

FOL. 150. (=T.C.D. 769). Plate X.

a. Both left side views, lengthwise on folio, heads facing head margin. Not quite so much care taken over the scaling as in T.C.D., and heads of both disproportionately large. The upper one green, darker on the back, with pale comma-like dashes, black patch on either side at back of head, sides yellowish, belly pale grey. It is a little difficult to decide which is " de bleeke ".

b. (=T.C.D. 770).

Dese twee soorte van schlangen worden gevonden/in de bosschen van St. Martins Klove, werdende de/bleeke van de inwoonders seer schadelÿ̈k gehouden.

These two kinds of snake are found in the bush in St. Martin's Kloof, the pale one is considered by the inhabitants to be very harmful. St. Martin's Kloof (valley) at the north end of Piquetberg and leading to Het Kruis, Redelinghuis, and Verloren Vlei.
The upper figure with black patches behind the head and the pale dashes is unmistakably the Yellow-lipped Snake (*Leptodira*). The lower figure is probably an Egg-eater (*Dasypeltis*).

FOL. 152. (Not in T.C.D.). Plate X.

a. Both pictures lengthwise on folio, heads facing head margin. Upper one with 4 brown stripes on back and an orange tail. Lower one with broad brown back and two lateral brown stripes on a yellow ground-colour, tail brown.

b. Dese twe vremde soorten van hagedissen worden meest/in 't gebergte der namaquas gevonden, van ons geobservoeer/den 20 December 1685.
These two strange kinds of lizard are mostly found in the mountains of the Namaquas, observed by us 20 December 1685.
[E.L.L.] 1. *Eremias*. 2. *Eremias Namaquensis* Dum. et Bib.

FOL. 154. (=T.C.D. 745, missing). Plate X.

a. Drawn lengthwise on folio, head facing foot margin. Brown with 7 or 8 blue lozenge-shaped patches along middle of back and tail, blue patches on arms and legs. Obviously intended to represent a species of *Agama*.

b. (=T.C.D. 746).
Dese soorten van hagedissen word op veele plaatsen tusschen/ en op de klippen gesien, geneerd sig met vliegen en alder :/hande kruÿpende gewormte, word van de inwoonderen/Hagou genoemd, gevonden den 5 9ber 1685.
This kind of lizard was seen in many localities between and on the rocks, nourishes itself with flies and all kinds of crawling creatures [worms], called by the inhabitants Hagou, found 5 November, 1685.

FOL. 156. (=T.C.D. 777). Plate X.

a. Lengthwise on folio, head facing head margin. The ligatured poison bag is relatively larger than in T.C.D.

b. (=T.C.D. 778).
De giftige slangen, werdende boven de 6 voeten lang werd/van de Inwoonders seer gesogt, want sÿ met het fenÿn haar/pÿlen en hasegaÿen vergiftigen, 't welk op volgende manier/toegaat : 't vel

van de boven kakebenen los gemaakt zÿnde/comt een land werpig blaasje voor den dag vol van kleine/glandulen, welkers einde ofte openinge bÿ de boven slag :/tand uÿtgaat, waar uÿt een Witte klare slÿm ofte saliva uÿt :/komt, 't welk eÿgentlÿk het fenÿn is, waar met sÿ/haar gewcer bestrÿken ; dit bursie of blaasje of [ . . . ? . . . ] /glandula salivalis, binden sÿ eerst aldernaast de tand/met een fÿn draatje toe, daar d'openinge is, anders soude door/het havenen en drukten de veninige Saliva 't eenemal/uÿtlopen; dit beurse gedroogt zÿnde snÿden sÿ het selve/van malcanderen, en bestrÿken als sÿ het voor nodig/agten haar geweer daar meede, dese slange welke/ over al gevonden word, wird bÿ alle hottentots hamachou/genoemd, den 8 9ber 1685 gesien.

This poisonous snake, reaching over 6 feet long, is very much sought by the inhabitants because they poison their arrows and assegais with its venom, which is done in the following manner : when the skin of the upper jaw is loosened there comes to light an elongate bladder full of small glands, the end or opening of which runs out near the upper fang, and from which exudes a white clear slime or saliva which is actually the poison with which they smear their weapons ; this bag or bladder or [ . . . ? . . . ] glandula salivalis they first bind with a fine thread next the fang where the opening is, else with handling and pressing the poisonous saliva would run out ; when the bladder is dry they cut it into pieces and smear their weapons with it when they think needful ; this snake which is found everywhere is called by all Hottentots hamachou, seen 8 November 1685.

[E.L.L.] *Naja haje*, Men.

In Waterhouse the identification suggested by the British Museum was " Mamba (?) ". The yellow colour of the S.A.M. picture clearly indicates that it is meant to portray the Yellow Cobra.

FOL. 158. (=T.C.D. 771). Plate X.

a. Lengthwise on folio, head facing head margin. More crudely drawn than T.C.D. Cf. Tachard (1st Voyage) fig. x, and Petiver (Gazoph.) pl. lvii, fig. 16.

b. (=T.C.D. 772).

Dit wonderlÿke boosaardige schepsel sÿnde een gehoornde/adder, word op diversche plaatsen des lands der namaquas/gevonden ; volgens 't verhaal van de Inwoonders/moet die genen die haar van gebeten is binnen/6 uuren sterven, en word van haar Choreep genoemd/gesien den 6 September 1685.

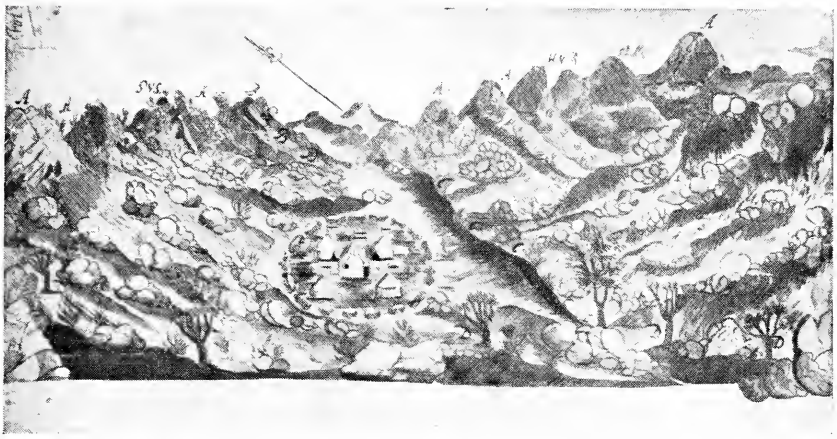
This wonderful [and] vicious animal appears to be a horned adder, was found at various places in the land of the Namaquas ; according to the statements of the inhabitants those who are bitten by it die

within 6 hours, called by them Choreep, seen 6 September, 1685.
[E.L.L.] *Vipera* (*Cerastes*) *Cornuta*.

FOL. 160. (=T.C.D. 751). Plate IX.

a. Lengthwise on folio, head facing head margin. Mouth open showing red palate ; apparently hastily done, barbels not clearly shown, scaling very irregular, scales far too numerous. Vent shown. Fins without rays, only a few rays indicated in tail. S.A.M. has the dorsal fin shown in its correct position, above or slightly in advance of the pelvic fin ; but in T.C.D. it is far forward, nearer to pectoral than to pelvic fin. Scales in T.C.D. nicely dotted in, but too few in number. In S.A.P.L. Z1 origin of dorsal fin is midway between base of pectoral and base of pelvic ; anal fin reaching to base of caudal, peduncle very short ; two barbels ; about 40-45 scales along the side. The correct number of scales for this fish is 41-45. The S.A.P.L. picture is therefore in this respect either a happy accident, or the result of accurate observation on the part of the artist. Dr. Andrew Smith's artist (1841), in a scientific publication, put in 63 scales in his illustration !

b. (=T.C.D. 752). Plate XII.
Dese soorte van Visch altemets over de drie a 4/voeten lang groeÿende, wird nevens ontelbare brasem[s/in groote menigte met de hoek in de Olÿphants Revier/gevangen, is wel soet en angenaam van smaak, maar/weekagtig van vleesch en vol kleÿne graatjes, 't welke een/groote tegenheid veroorsaakt, ook is het kuÿt van dese/visch schadelÿk, wand ÿmand daar van gegeten hebb[en/word anstonts qualÿk, met groote pÿn in de buÿk, gev [ind/ook geen betershap voor dat hÿ sterk an 't braken ge :/raakt is, 't welk noÿt uÿtblÿvt, gevangen den 18 7ber 1685.
This kind of fish, often growing to over 3-4 feet long, was together with innumerable bream caught in large numbers with the hook in the Olifants River, is sweet and pleasant in flavour, but soft-fleshed and full of small bones, which necessitate great care [in eating], also the roe of this fish is harmful for when anyone has eaten it, he instantly becomes ill, with great pain in the stomach, and finds no relief until he has thoroughly vomited so that nothing remains [in his stomach], caught 18 September 1685.
[E.L.L.] *Barbus capensis* A. Smith.
The folio is loose, with the back margin torn in places, hence the endings of some of the words are missing.
T.C.D., S.A.M., and S.A.P.L. are the first known attempts to portray the Olifants River or Clanwilliam Yellow-fish (*B. capensis*), nowadays well-known as a sporting fish.



Fol. 3.

Fol. 5.

PLATE I.

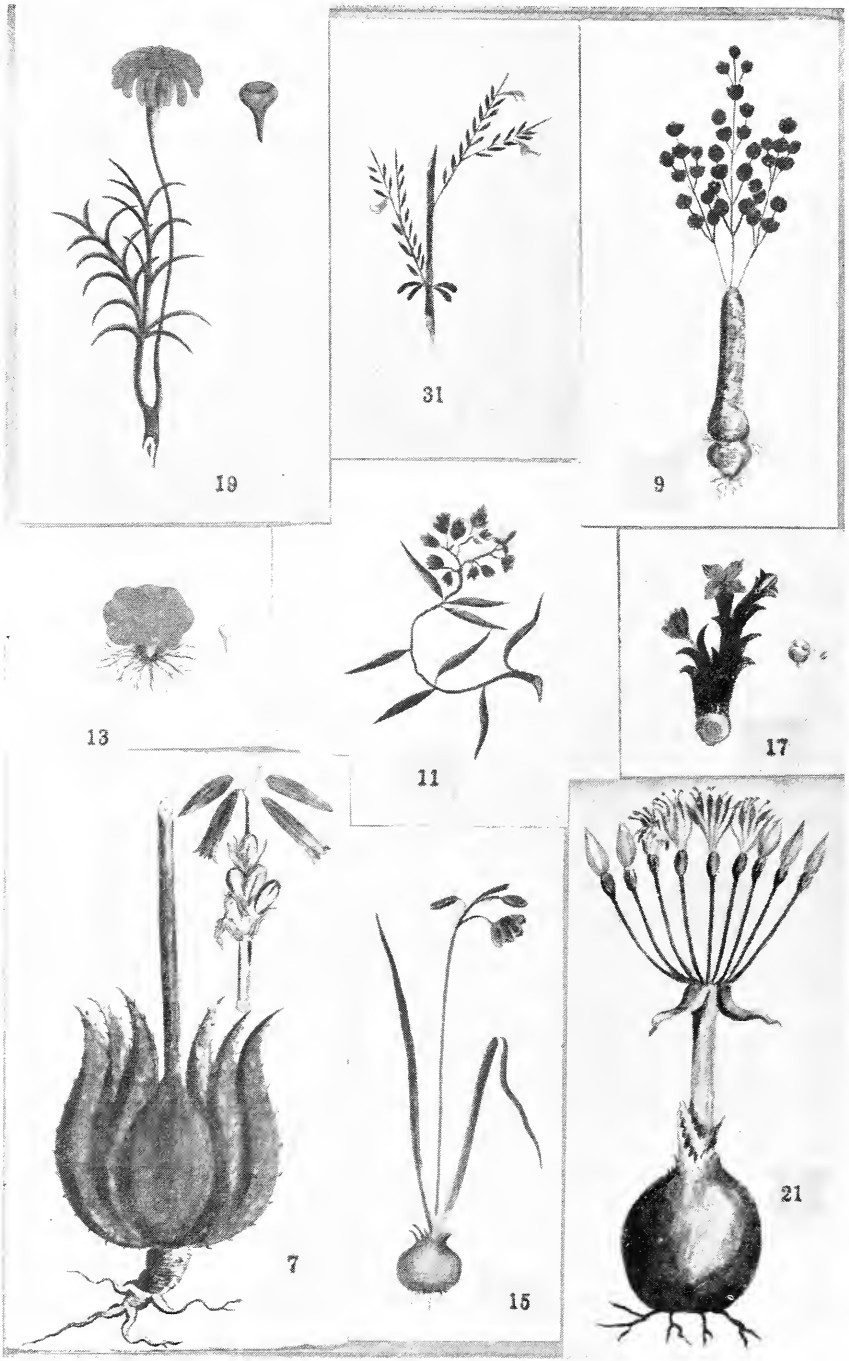



PLATE II.

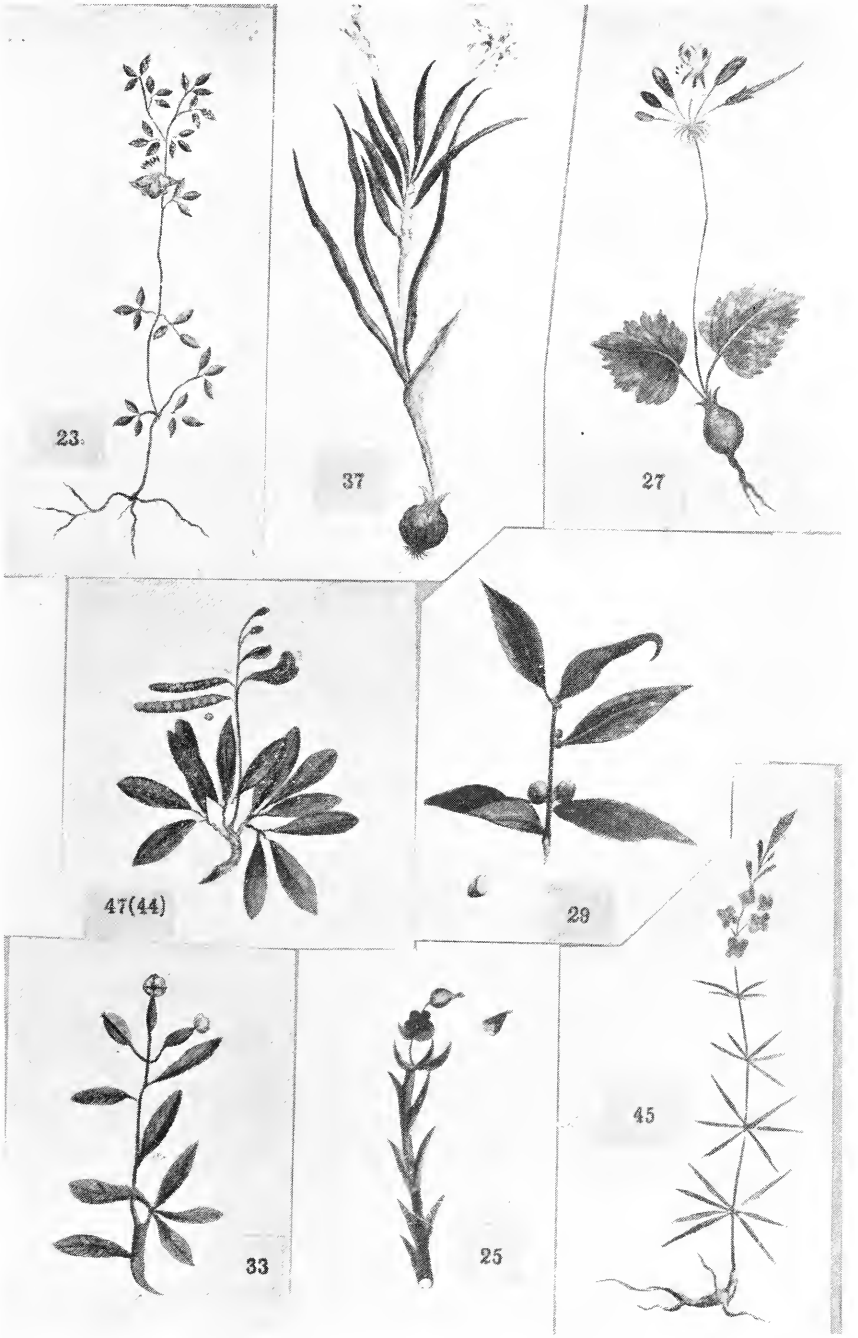



PLATE III.

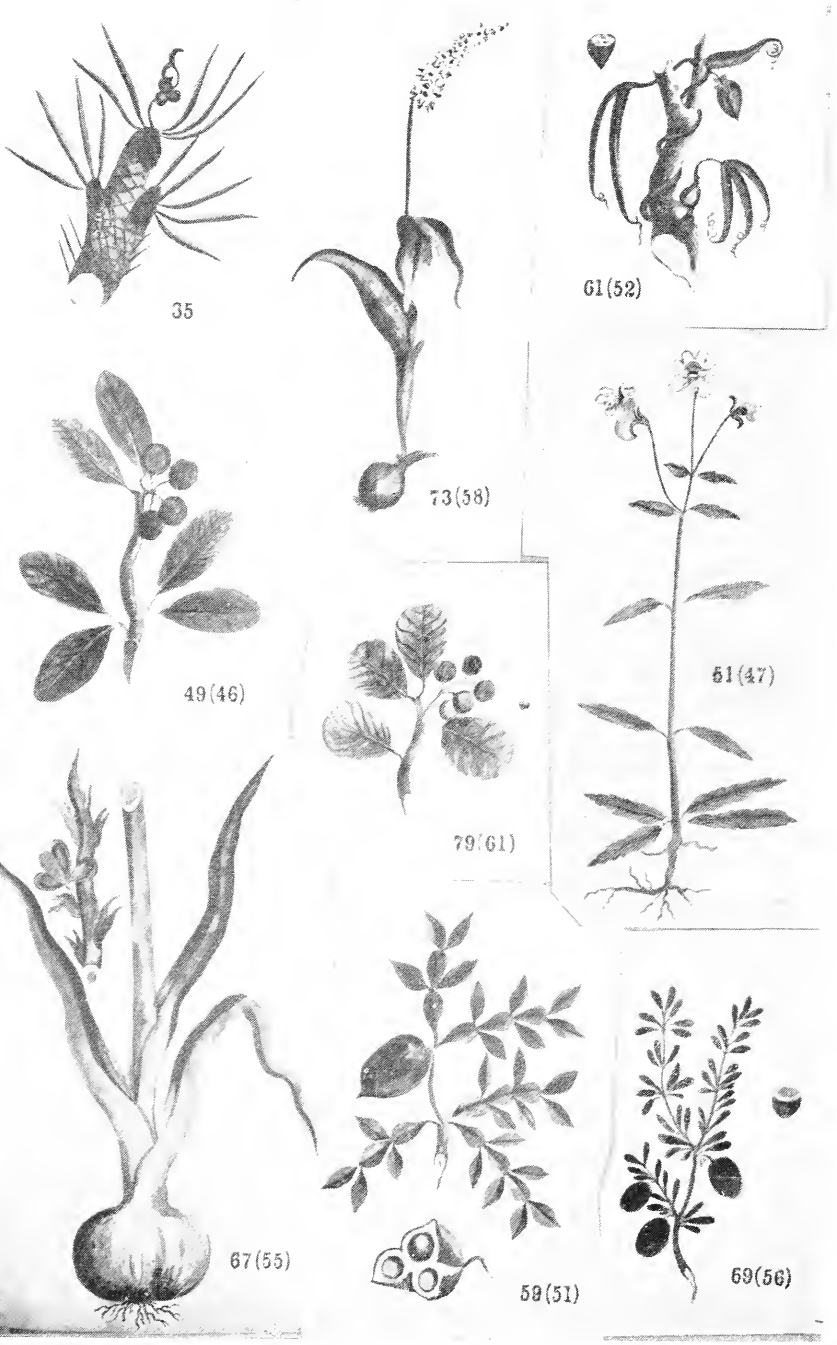
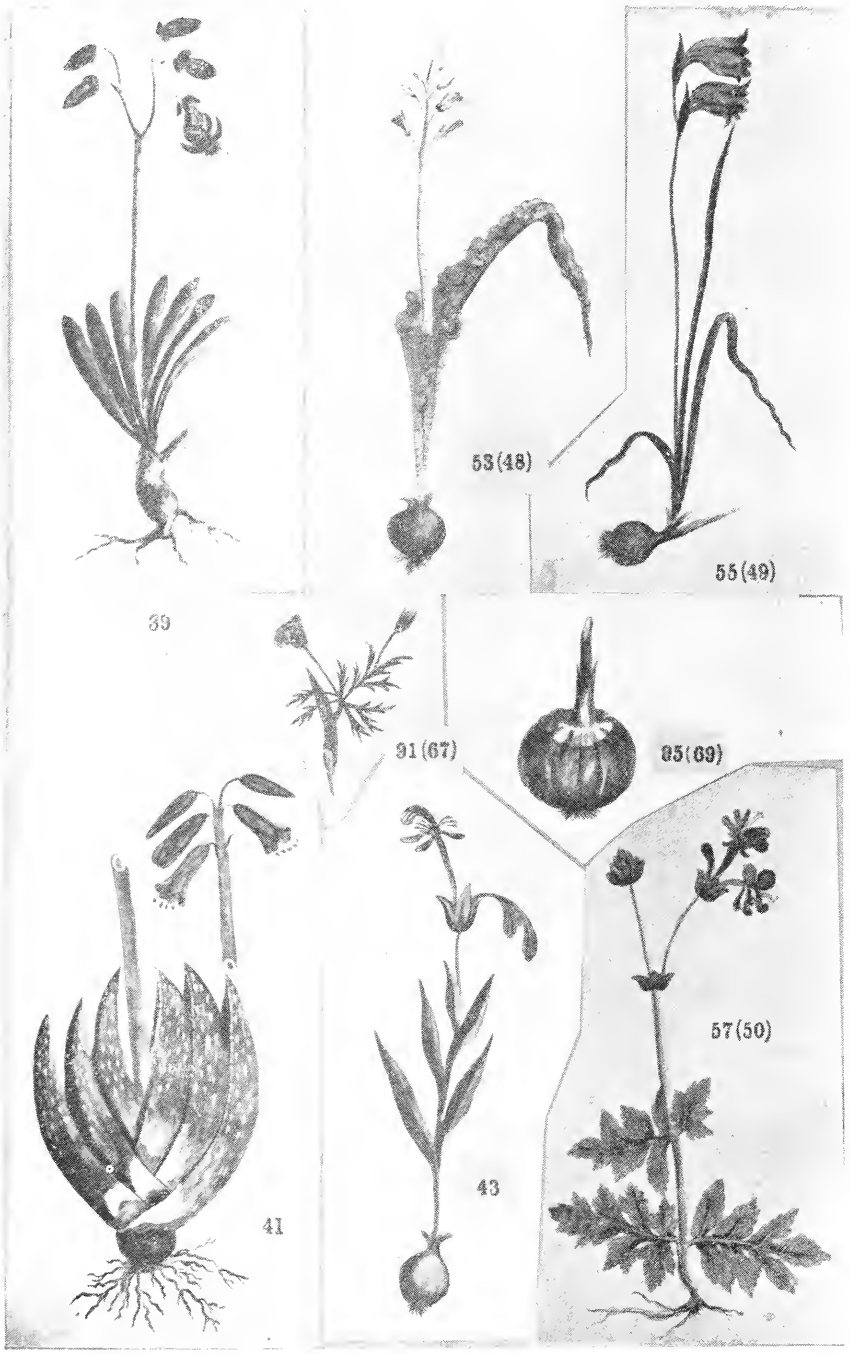



PLATE IV.

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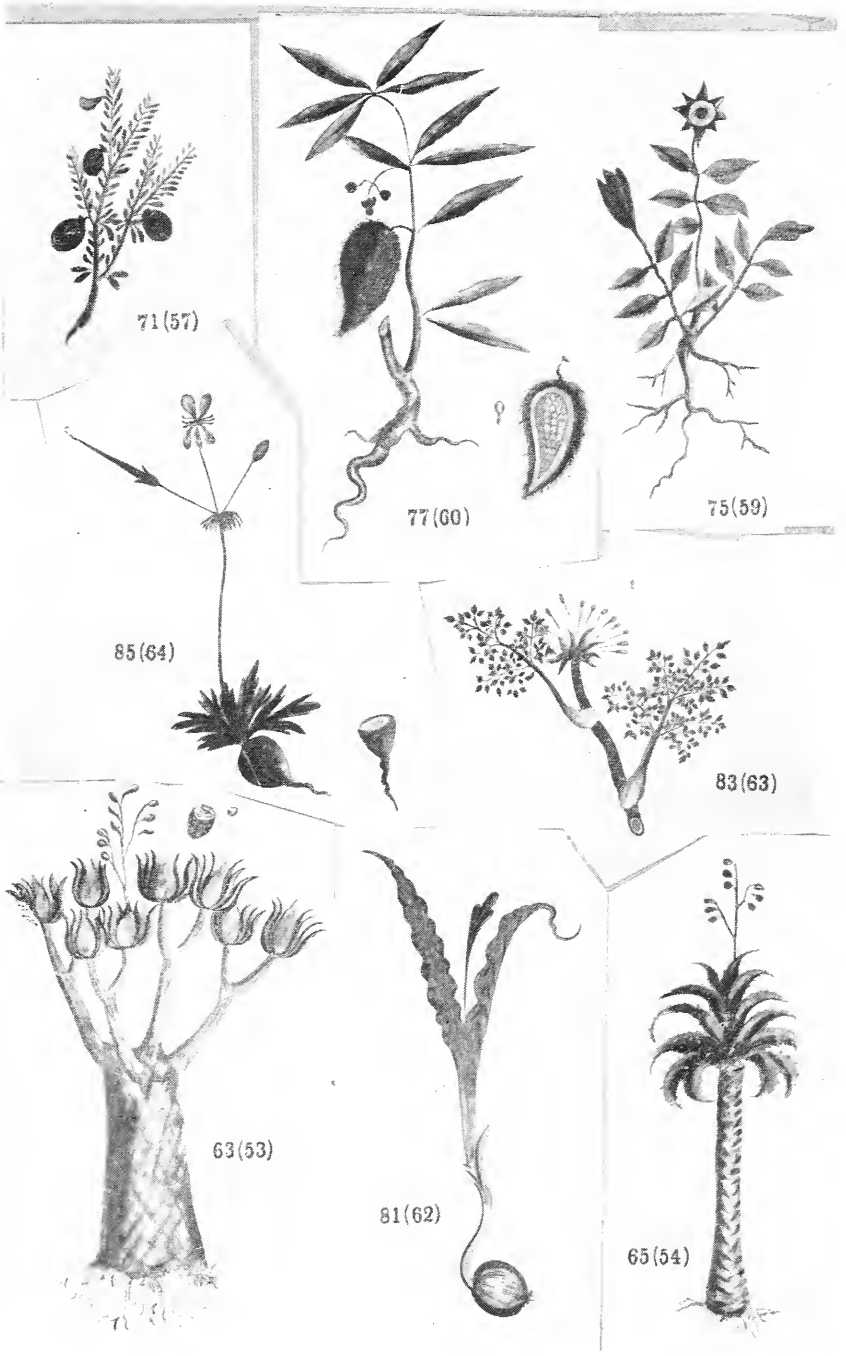


PLATE VI.

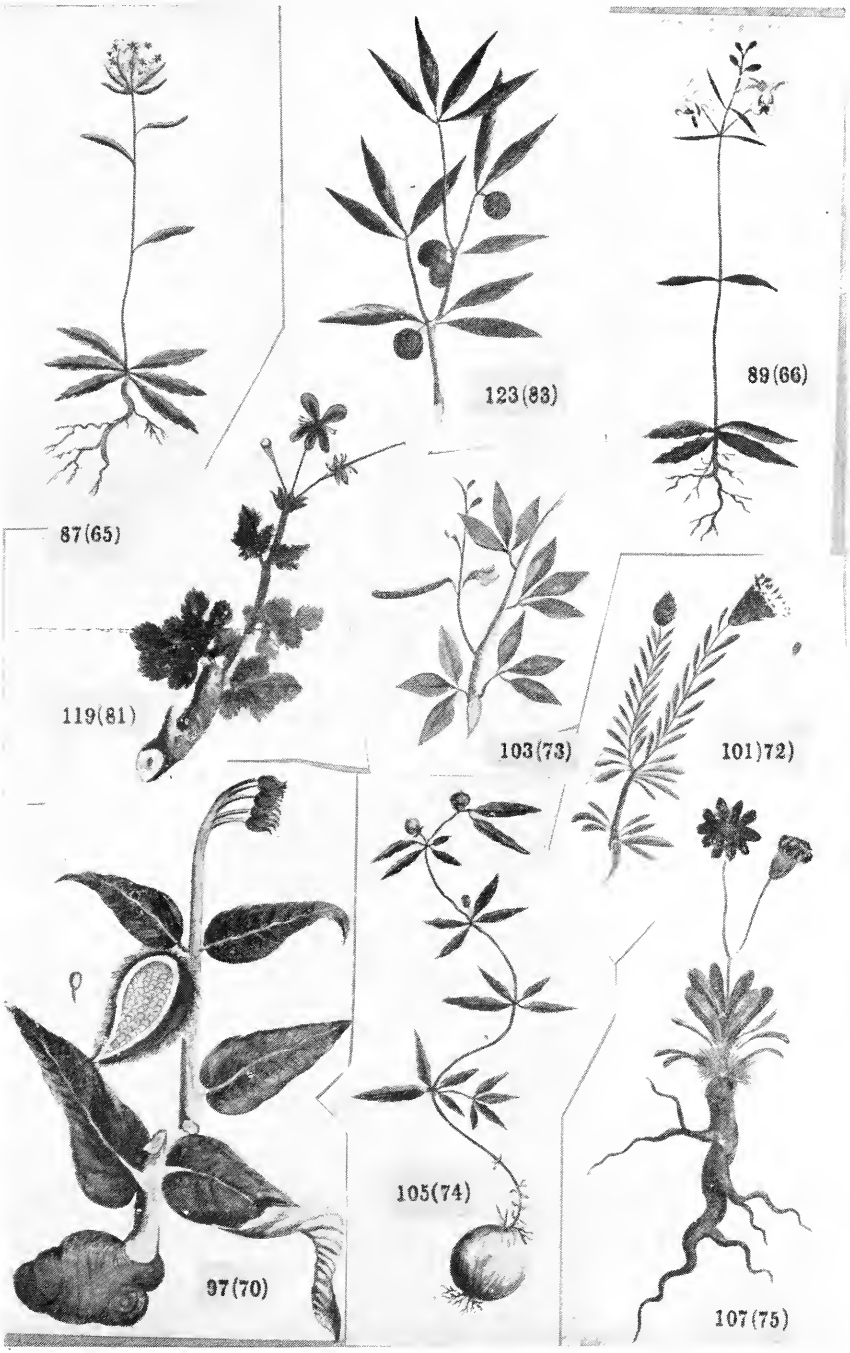


PLATE VII.

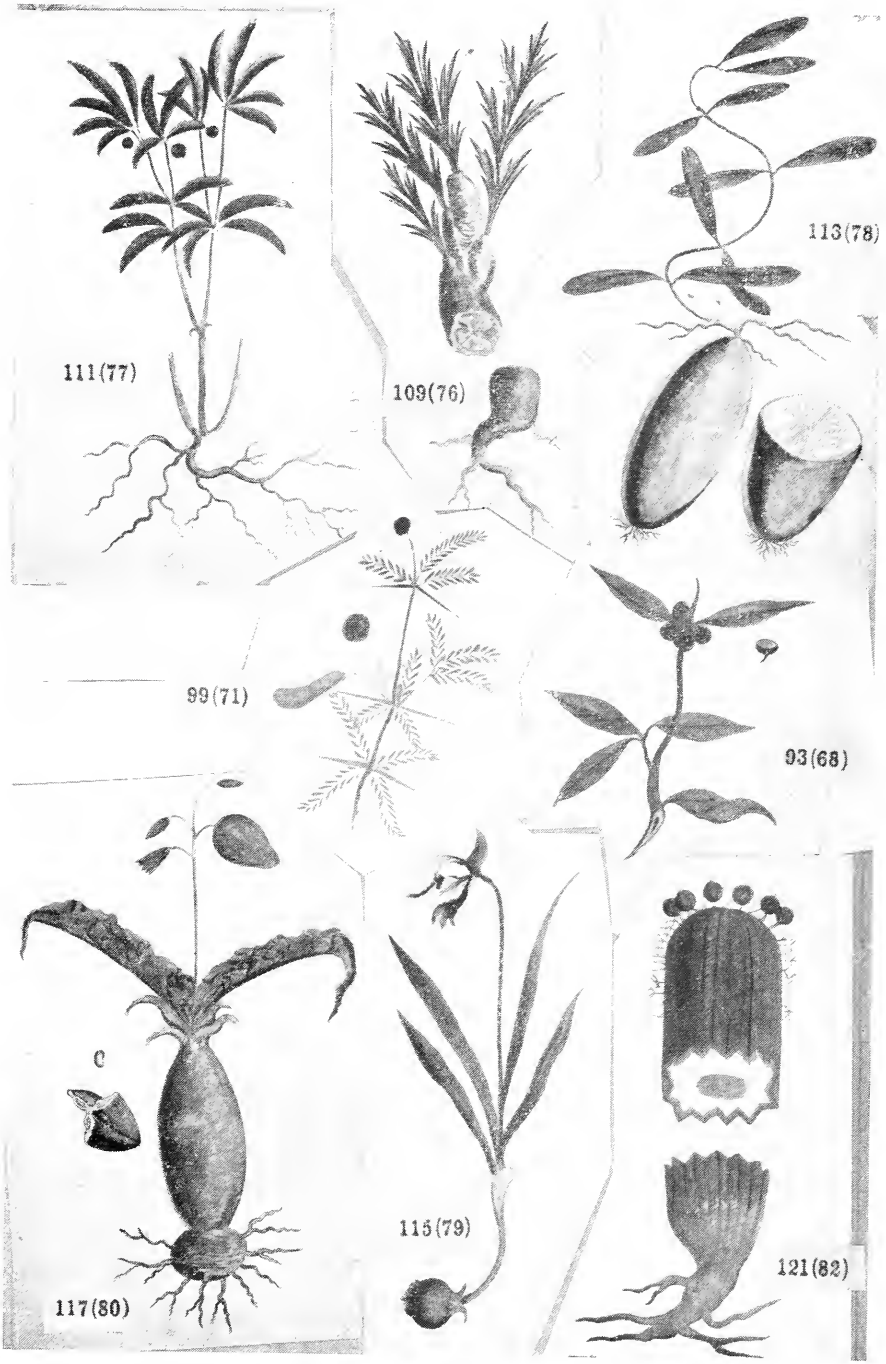


PLATE VIII.

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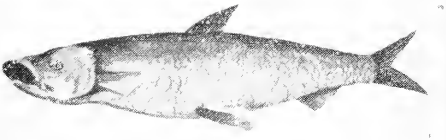

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PLATE IX.

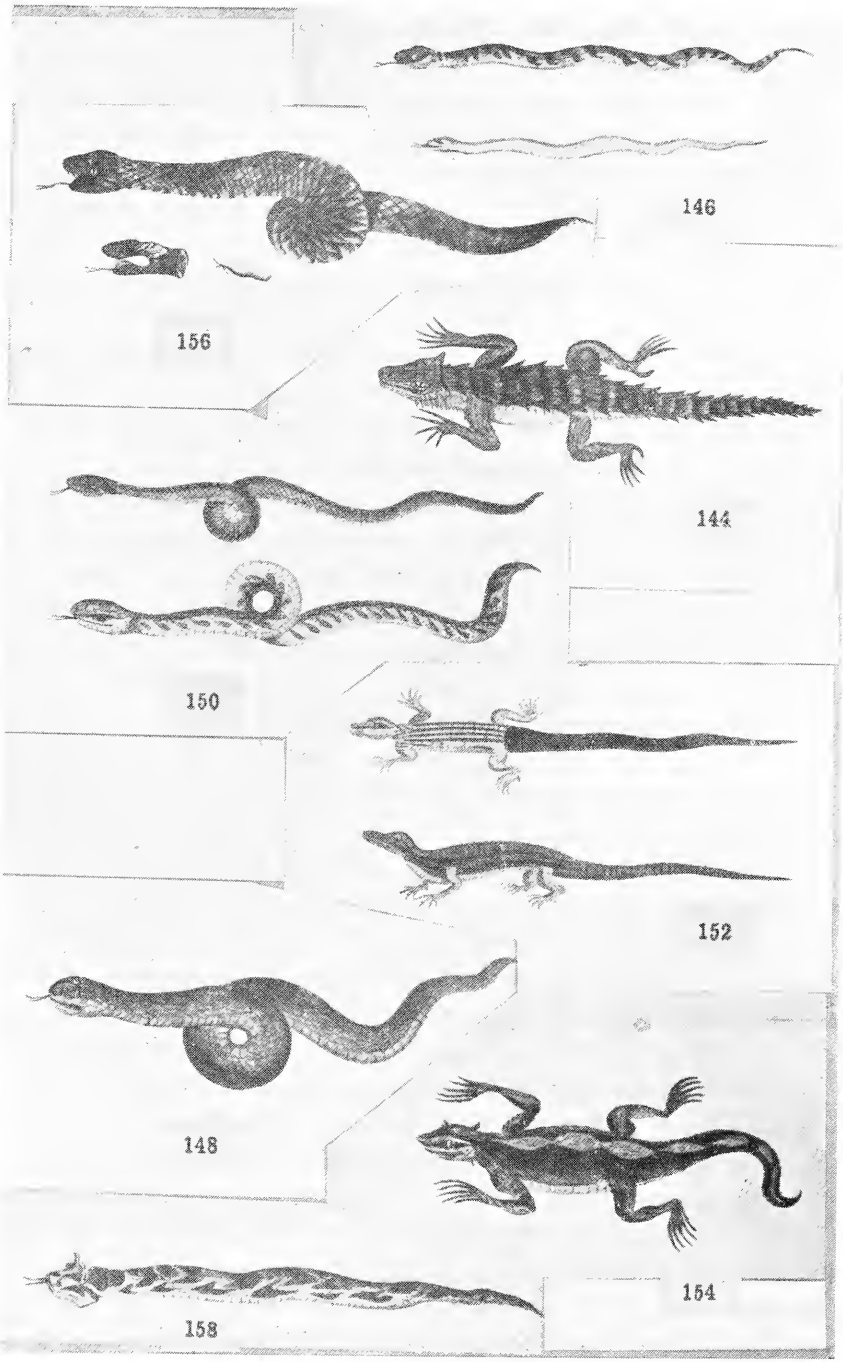



PLATE X.

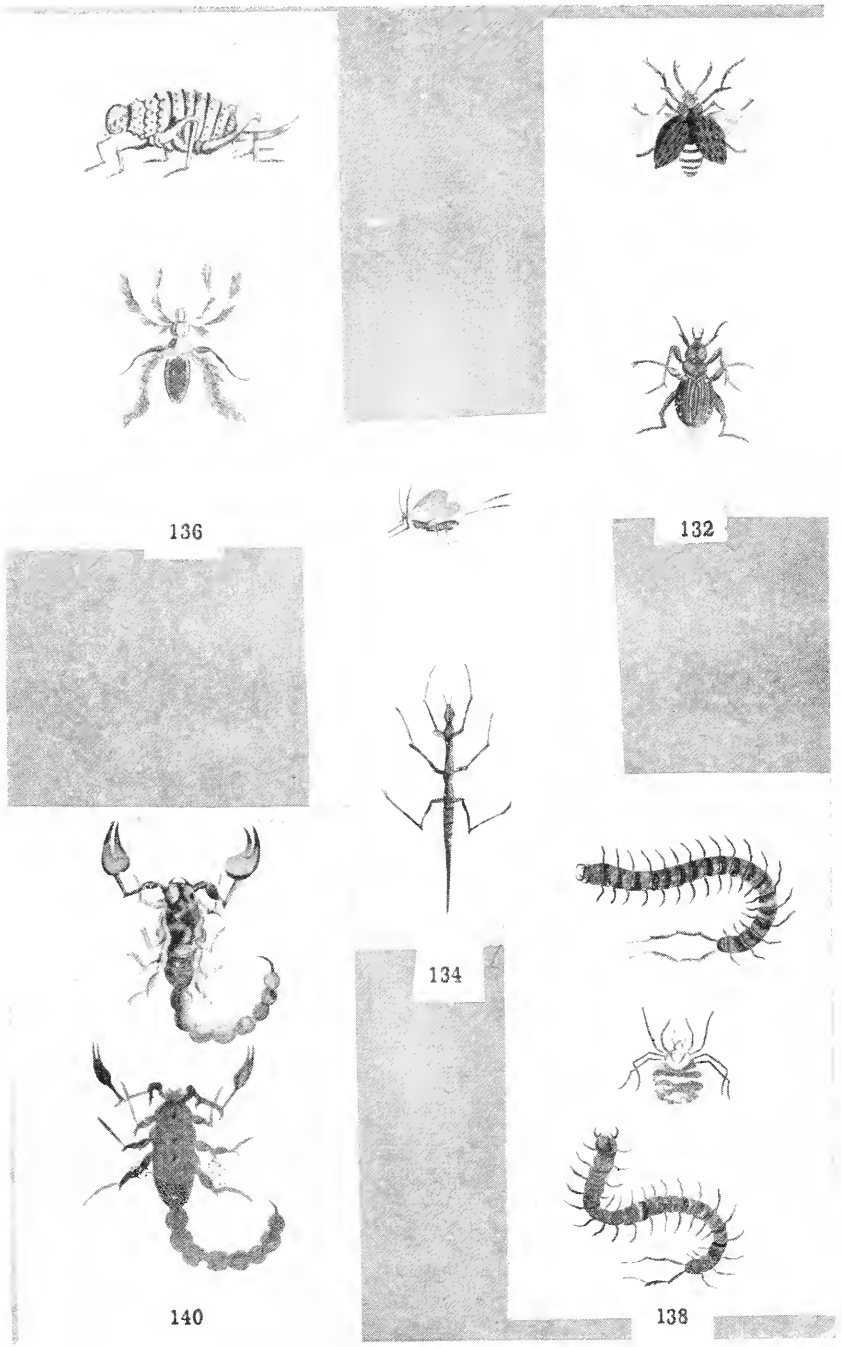
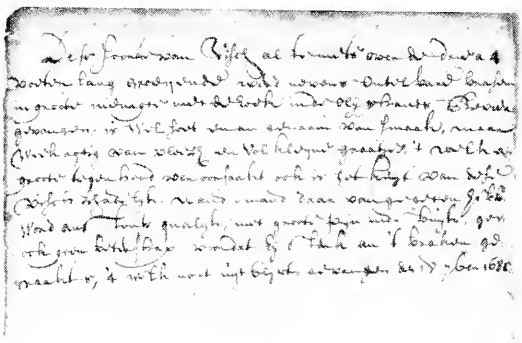
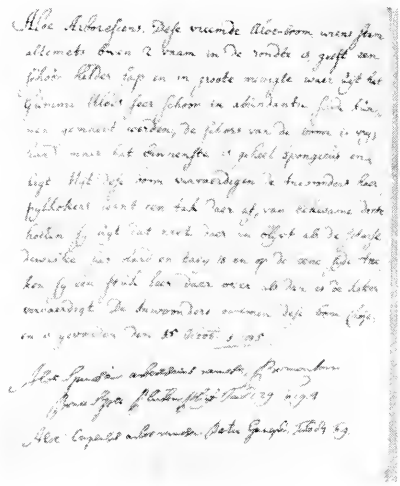


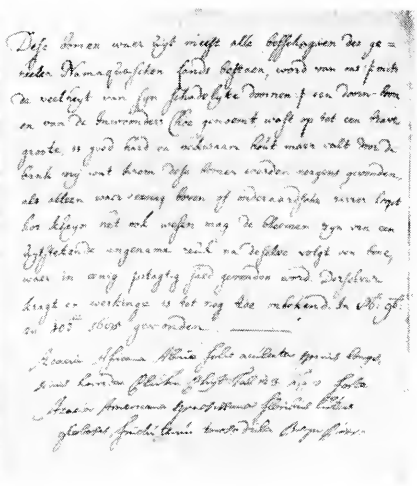

PLATE XI.



Fol. 160 Reverse.



Fol. 63 (53) Reverse.



Fol. 99 (71) Reverse.

PLATE XII.

JOURNAL

OF

SOUTH AFRICAN BOTANY

VOL. XIII.

# PLANTAE NOVAE AFRICANAE.

"Ex Africa semper aliquid novi."—*Pliny.*

## SERIES XXVII.

By Miss F. M. Leighton, Mrs. M. R. Levyns and Rev. Father J. Gerstner.

**Epischoenus,** C.B.Cl. (Cyperaceae-Schoeneae). (Introductory note by Margaret R. Levyns).

Until 1941 *Epischoenus quadrangularis* (Boeck.) C.B.Cl. was the only species known in the genus. In that year a second species, *Epischoenus gracilis,* was described (Levyns, Journ. S.Af. Bot. VII, p. 81). Recently three more species have been discovered and a casual glance at herbarium material makes it clear that there are several additional species which require study. The writer proposes to make a thorough investigation of the genus but as this will involve much field work the following descriptions and notes are being published now.

The first account of *Epischoenus quadrangularis* was given by Boeckeler who named it *Schoenus quadrangularis.* He quoted as his type Burchell 557 which was collected on the 24th January 1811, a day on which Burchell made the ascent of Table Mountain and obtained a very large number of plants on the summit. This plant now known to us as *Epischoenus quadrangularis* C.B.Cl. is still to be found where Burchell discovered it and, as far as present records go, is the only species on the upper plateau of the mountain. Thus there can be no doubt as to the identity of the plant Boeckeler described. If any uncertainty had

existed it would have been dispelled by his description in which the ovary is stated to be linear-oblong, stipitate and trigonous. No mention is made of the fruit which apparently he never saw. Fig. 1, f. depicts a ripe fruit drawn from living material collected on Table Mountain. The nut is stipitate, pale brown when ripe and possesses a characteristic dark patch at the apex with a dull matt surface in contrast with the smooth shining surface elsewhere. It is easy to imagine such a nut developing from the ovary described by Boeckeler.

When Clarke transferred this species to Epischoenus he extended Boeckeler's description and described the nut as being sessile, sub-globose, obscurely trigonous and marble-white. For many years the writer has been unable to account for the discrepancy between Clarke's account of the nut and the nut itself. The discovery of *Epischoenus adnatus*, described below, in which the nut fits Clarke's description makes it clear that he must have had fruiting material of this species and wrongly assigned it to *Epischoenus quadrangularis*.

As might be expected Clarke's definition of Epischoenus will need modification in view of recent discoveries. Nevertheless the prolongation of the axis above the uppermost flower in the spikelet, a feature on which Clarke laid much stress, still remains the distinctive feature of the genus.

**Epischoenus adnatus,** Levyns sp.nov.

Herba perennis, caespitosa, glabra, caulibus leviter sulcatis. *Folia* omnia basalia, lamina minuta setacea. *Inflorescentia* laxa, spiculis 2—4 instructa. *Bractea* inferior inflorescentia longior. *Spiculae* circiter 8 mm. longae, complanatae. *Glumae* distichae, inferiores 5—7 vacuae. *Rachilla* ultra florem bisexualem producta, bractea adnata. *Nux* sub-globosa, sessilis, vix triquetra, marmoreo-alba.

Plant densely tufted, 1·0—1·3 m. high. Stems erect or drooping when in shady places, slender, wiry, grooved. Leaf sheaths deep red at the base, becoming pale above, glabrous, firm in texture. Lamina setaceous, 1·0—2·0 cm. long, the same colour as the sheath. Inflorescence lax, the spikelets 2—4, exceeded in length by the lowest bract (Fig. 1, a.). Spikelet about 8 mm. long, flattened, brown (Fig. 1, b.). Bracts 2-ranked, the lowest 5—7 sterile, succeeded by a bract with a male flower having an abortive gynoeceum (occasionally this flower lacking), finally a bract with a bisexual flower (Fig. 1, e). The flattened axis continued above the bisexual flower and adnate to the bract, bearing a small sterile bract near its apex (Fig. 1, c). Stamens 3. Style well developed, somewhat thickened and 3-angled at its base ; style branches 3. Fruit almost globose, obscurely trigonous, sessile, marble-white and shining (Fig. 1, d).

*Hab.* Cape Province, Cape Division: Ferny Gully on the eastern slopes of Table Mountain, 1,500—2,000 ft.: collected 11th August, 1946. *Esterhuysen* 12938, (*Type*); The type specimen is in fruit and the above description is based partially on *Esterhuysen* 12629, a flowering specimen

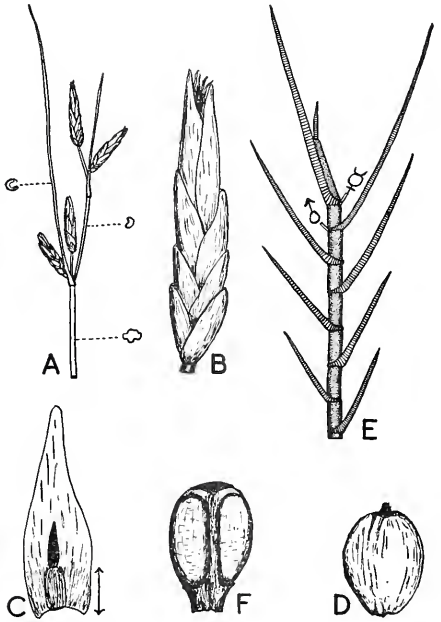



Fig. 1. A.—E. *Epischoenus adnatus*. A. inflorescence nat. size. B. a single spikelet × 5, C. uppermost bract of B. showing the adnate axis and small terminal bract. The arrow indicates the region in which the axis and bract are united × 5. D. Fruit ×5. E. Diagram of the spikelet of *Epischoenus adnatus* showing its cymose nature. The internodes, except the uppermost which is adnate to the bract, have been elongated for the sake of clarity. F. *Epischoenus quadrangularis* Fruit × 5.

collected on the 17th February, 1946, on the same slope but at a slightly lower altitude. This species is only known from the slopes of Table Mountain between Newlands and Kirstenboseh, and was discovered by Miss E. Esterhuysen whose excellent collections of Cyperaceae are extending our knowledge of this imperfectly known family. It is similar in aspect to *E. gracilis* but is easily distinguished by the adnation of the supra-floral flattened axis and its subtending bract, and by the characteristic fruit.

**Epischoenus eriophorus,** Levyns sp. nov.

Herba perennis, caespitosa, glabra, caulibus teretibus vel complanatis. *Folia* omnia basalia, lamina minuta vel nulla, vagina glabra. *Inflorescentia* congesta, spiculis erectis. *Bractea* infima inflorescentia longitudine aequalis. *Spiculae* circiter 15 mm. longae, complanatae. *Glumae* distichae, apice extremo lanuginosae, 10—14 inferiores vacuae. *Rachilla* ultra florem bisexualem producta, bractea paulo adnata.

A tufted perennial about 60 cm. high, without green leaves, the leaves reduced to reddish brown, glabrous sheaths clasping the bases of the flowering stems. Flowering stems fairly stout terete or slightly flattened, bearing towards the apex two leaf-like bracts in the axils of which are a few rather crowded erect spikelets (Fig. 2, a). Spikelets about 15 mm. long, narrowly lanceolate, compressed, bearing from 12 to 16 distichous bracts, 2—3 of the uppermost with flowers, the rest sterile, the lower bracts acuminate, the upper somewhat obtuse, all but the basal bracts brown with white scarious margins, each with an apical tuft of white wool, the woolliness extending downwards for a short distance along the margin (Fig. 2, b). Lower 1—2 flowers male, sometimes with an abortive gynoeceum, uppermost flower bisexual; the axis of the spikelet continued beyond the flower, shortly adnate to the uppermost visible bract, soon becoming free and bearing a small wool-tipped bract at its apex. (Fig. 2, c) Perianth bristles none. Stamens 3. Ovary narrowly obovoid, bluntly trigonous, the apex obtuse, minutely downy. Style slender, much longer than the ovary, with 3 branches. (Fig. 2, d) Fruit not seen.

*Hab.* Cape Province: Ceres Division; A marsh at the southern entrance to Elands Kloof. *Levyns* 8142 (*Type*, in the Bolus Herbarium). Found growing with *E. gracilis* which forms much larger and more definite tussocks. Distinguished from all other species by its large spikelets with characteristically wool-tipped bracts.

*Flowering season*: December.

**Epischoenus villosus,** Levyns sp. nov.

Herba perennis, caespitosa, caulibus gracilibus, teretibus. *Folia* omnia basalia, lamina minuta vel nulla, vagina suprema villosa. *Inflorescentia* congesta, spiculis paucis, erectis. *Bractea* infima inflorescentia longior. *Spiculae* circiter 9 mm. longae, paulum complanatae. *Glumae* distichae, 4—5 inferiores vacuae. *Flores* 1—4, omnia mares, vel inferiores mares et supremus bisexualis. *Rachilla* ultra flores producta, *Nux* ellipsoidea, pallida, triquetra, breviter stipitata, rostro parvo, obtuso.

A tufted perennial about 90 cm. high, without green leaves. Leaves reduced to sheaths, pale but becoming mahogany red at the base, the

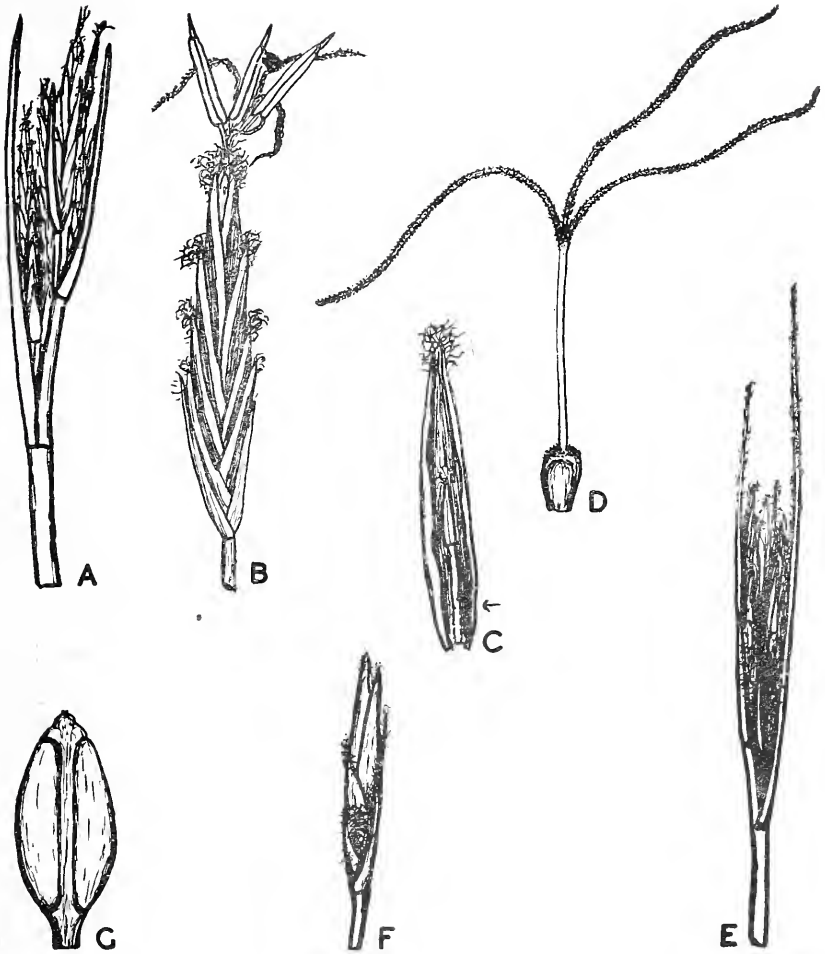



FIG. 2. A.—D. *Epischoenus eriophorus*. A. inflorescence × 2. B. a single spikelet × 4. C. the uppermost bract of B. viewed from the adaxial side, showing the prolongation of the axis and the small bract at its apex. The arrow indicates the level below which the axis and bract are adnate, × 4. D. gynoeceum × 4. E.—G. *Epischoenus villosus*. E. inflorescence × 2. F. a single spikelet × 4. G. Fruit × 10.

uppermost villous. Flowering stems terete, slender, bearing towards the apex 2 or 3 erect bracts shortly overtopping the few, closely placed, spikelets. (Fig. 2, e) Spikelets about 9 mm. long, narrowly lanceolate, somewhat compressed, with 6 to 8 distichous bracts, the lower 4 sterile, the lowest acuminate, rather longer than the other sterile bracts; the fertile bracts longer than the sterile, sub-acute or obtuse; all bracts villous towards the apex, the lower densely fringed with long hairs tending to mat together. (Fig. 2, f) Flowers 1—4 in a spikelet, all male or the lower male and the uppermost bisexual, all male flowers without an abortive gynoeceum. Continuation of the axis of the spikelet free from the bract, bearing a well developed bract at its apex which sometimes encloses an abortive male flower. Perianth bristles none. Stamens 3. Style branches 3. Fruit narrowly ellipsoidal, pale in colour, trigonous, shortly stipitate, with a small, rather obtuse beak. (Fig. 2, g.).

*Hab.* Cape Province: Caledon Division; Close to a stream near the mouth of the Palmiet River. *Levyns* 8150 (*Type*, in the Bolus Herbarium).

*Flowering season*: January—February.

This species shows an unusual degree of variation in the number of flowers in a spikelet. It is the only species in which an abortive but obvious male flower has been seen enveloped by the small, terminal bract. It may be distinguished even when not in flower, by the villous sheath of the uppermost leaf.

**Albuca imbricata,** Leighton sp. nov. (Liliaceae-Scilleae).

Plantae alt. 25—30 cm. *Bulbus* globosus vel depresso-globosus, imbricatus. *Folia* 6—12, synanthia, canaliculata. *Pedunculi* saepe 2—3. *Racemus* laxus, pauciflorus. *Perianthii segmenta* aurea, flavo-viridi-vittata. *Stamina* tria exteriora sterilia.

*Hab.* Cape Province: Cape Division; clearing at Kirstenbosch, *Esterhuysen* 6258 (*Type*); 8213; 12543 (in fruit); Bergvliet, *Purcell* 15718 (in Bolus Herb.)

Plants 25—30 cm. high. Bulb globose or depresso globose, tunics imbricate, diam. 3—4 cm. Leaves 6—12, canaliculate, coincident with the flowers, 12—30 cm. long, 5—6 mm. broad at the base. Peduncles often 2—3 to a bulb. Raceme lax, few-flowered. Perianth segments golden yellow with a broad median yellowish-green stripe, outer oblong 2—2·3 cm. long, inner ovate 1·5—1·8 cm. long with a cream hooded apex 3 mm. broad, 2 mm. long. Three outer stamens sterile. Ovary oblong 7—8 mm. long; style and conical stigma 6—7 mm. long. Capsule ovoid.

This species is distinguished from *A. spiralis* L.f. by its loosely imbricate bulb scales, and by the complete absence of glandular hairs on the leaves.

**Boophone haemanthoides,** Leighton sp. nov. (Amaryllidaceae—Haemantheae).

Plantae alt. 30—50 cm. *Bulbus* ovoideus vel rotundus : tunicibus et radicibus ex axi basale duro corneo emersis, tunicibus externis multis

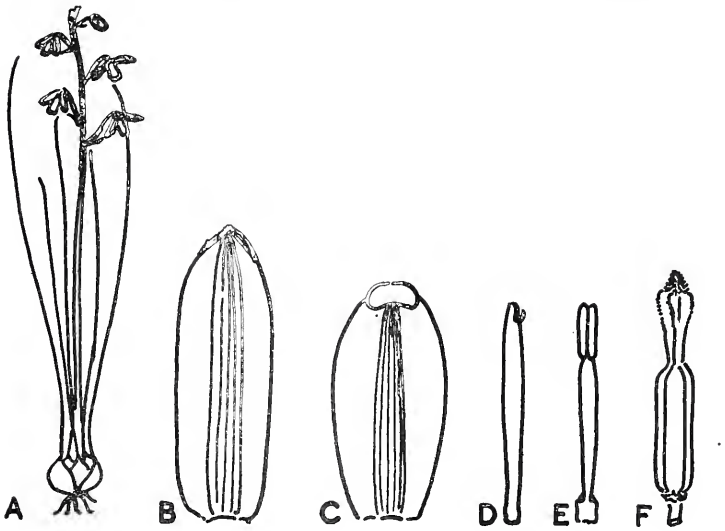



Fig. 3. *Albuca imbricata*. A. Plant × $\frac{1}{4}$. B. Outer perianth segment. C. Inner perianth segment. D. Staminode. E. Stamen. F. Gynoecium. B—F.. × 2. (*Esterhuysen* 6258). *Del.* F. M. Leighton.

membranaceis. *Folia* 6—8, longo-ovata vel lanceolata, hysterantha, margine glabro, integro. *Scapus* lateraliter compressus. *Umbella* multiflora compacta : *spathae* valvae 2, persistentes : *bracteae* angustae, lineares. *Perianthii tubus* angulatus et sulcatus : *segmenta* subaequales, tubo multo longiores, apice valde cucullata, albida, aetate plus minus rubescentia. *Stamina* exserta : *filamenta* segmentis affixa, erecta vel suberecta. *Ovarium* angulatum obconicum : *stylus* gracilis staminibus longior : *stigma* parva, integra, minute papillosa.

*Hab.* Cape Province : Piquetberg Division : St. Helenafontein behind the sandhills, *L. Bolus* in Bolus Herb. 21276. (*Type*). Malmesbury Division : Saldanha Bay, *Leighton* 2361. Little Namaqualand : Wallekraal, *Pillans* in Bolus Herb. 18241 ; Komkans, *V. S. Peers* in Bolus Herb. 23320.

Bulb ovoid or rotund up to 18 cm. diam. : tunics and fleshy roots

arising from the tough horny axis 3—5 cm. diam., 2—4 cm. high. Leaves hysteranthous, 15—30 cm. long, 5—10 cm. broad, entire, obtuse. Scape 15—25 cm. long, 2·5—3 cm. diam.: umbel many-flowered, dense: spathe valves 2, pinkish or red up to 14 cm. long and 8·5 cm. broad,

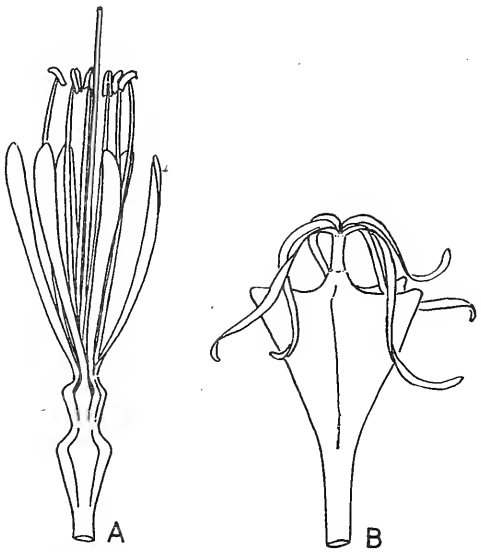



FIG. 4. *Boophone haemanthoides*. A. Flower. B. Fruit. Both nat. size (A. *L. Bolus* in Bolus Herb. 21276: B. Leighton 2361). *Del.* F. M. Leighton.

sub-erect even when the flowers are open, recurving towards the obtuse apex. Flowers regular, perianth creamy yellow becoming reddish with age: perianth tube 5—7 mm. long, 6-angled with deep grooves between the angles: segments 3—3·5 cm. long, cucullate, 3—4 mm. broad near the apex narrowed to 2 mm. at the base. Stamens exserted 1 cm. or more beyond the perianth, filaments slender, erect, attached to the perianth segments a little above the tube. Style 5—10 mm. longer than the stamens, stigma small, inconspicuous, minutely papillose, ovary obconic, sharply angled.

*Boophone haemanthoides* differs from *B. disticha* in the following:—

1. The perianth tube is shorter.
2. The perianth segments remain erect or sub-erect until they wither.
3. The spathe valves are larger.
4. The perianth is cream-coloured becoming reddish only with age.

From *B. guttata* (L) Herb. it differs in the shape and size of the flowers and in its entire margined leaves.

**Psammotropha stipulacea,** Leighton (Aizoaceae—Mollugineae).
Fruticulus erectus, glaber, caulibus rectis. *Folia* supra convexa,

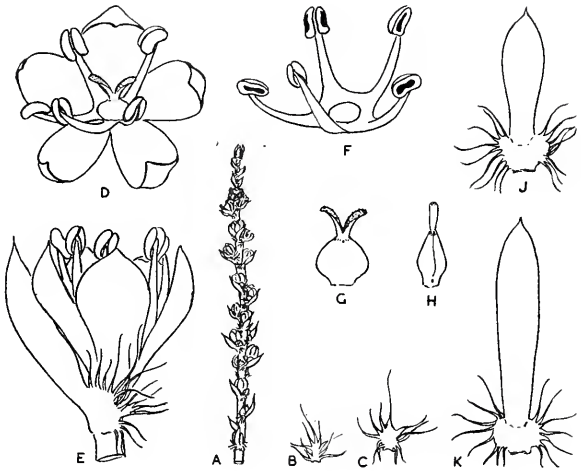



FIG. 5. *Psammotropha stipulacea.* A. Branch, nat. size. B, C. Flower bracts. D. Flower, front view. E. Flower (slightly younger), side view. F. Stamens. G, H. Gynoecium, front and side view. B.—H. × 10. J. Leaf subtending flower. K. Leaf from lower down the stem. J.—K. × 5. (*Leighton* 2189) *Del.* F. M. Leighton.

infra concava, stipulis fimbriatis instructis, crasse marginata, mucronata. *Flores* breve pedicellati, axillares, solitarii. *Stamina* basi in cupulo connata. *Ovarium* biloculare; *stylo* breve: *stigmata* 2: *ovula* 2.

*Hab.* Cape Province: Worcester Division; Romansrivier, on clayey flats, *Leighton* 2189 (*Type*); *Compton* 18702; between Darling Bridge and Artois, *Esterhuysen* 6085. Clanwilliam Division: between Pakhuis and Heuningvlei, *Esterhuysen* 12067.

Erect woody plants 12—25 cm. high with simple stems arising near the base, sometimes giving rise to short lateral branches. Leaves alternate, 3—8 mm. long, 1—1·5 mm. broad. Flowers solitary in the axils of the leaves, subtended by 2—3 scarious bracts. Sepals 5, broad, cucullate, greenish in the centre near the base, scarious around the margins 2—2·5 mm. long, 1·5—2 mm. broad. Stamens 5, about as long as the sepals.

Ovary two-chambered with one ovule in each chamber : style short : stigmas 2, with granular stigmatic surfaces.

Many of the plants had been burnt a year or two previously and most of the flowers were on coppice shoots. *P. stipulacea* is locally abundant. The flowers have a strong honey-scent.

This plant resembles the genus Polpoda in habit, in having a bilocular ovary and two stigmas and in its conspicuous, fringed stipules. It differs, however, in having the filaments joined to form a continuous ring at the base and in the absence of a corolla.

**Albizzia suluensis,** Gerstner (Leguminosae—Mimoseae).

Arbor pulchra silvestris, cortice cano et glabro. *Basis* 30—60 cm. diam., altitudo 10—15 m. *Folia* alternata, biparipinnata, 20 cm. longa, circa 12 cm. lata. *Petioli* 4—5 cm. longi, hirtelli. Infra apicem petioli et inter pinnas apicales sunt *glandes* singulae, conicae. *Pinnae* (3—4) 8—10 cm. longae, circiter 4 cm. latae. *Pinnulae* (6—8) plus minusque obliquae, lanceolatae concolores, apice mucronato, basi acuta obliquaque. *Lamina* integra noma minutissime crenulata, margine pellucida, glabra, supra subterque nitentia. *Costa* media nervique laterales (6 pares) supra paululum infraque multum prominent. *Stipulae* duae separatae laterales. *Inflorescentia* apicalia paniculata. *Capita* 1—4 albida-lutescentia in fasciculis. *Capita* floribus circiter 25, gemmentia globosa, plene florescentia hemisphaerica. *Calyx corollaque* albo-lutescens, tomentosa, quinquelobata, 4 mm. longa, 2 mm. lata. *Tuba staminalis* 2 mm. exserta. *Filamenta* circiter 20 irregulariter confluentia, 7 mm. longa. *Antherae* globosae 0·2 mm. diam. *Stylus* filiformis non eminens. *Legumen* colore luteum planum, oblongum 13—16 cm. longum, circa 2·5 cm. latum. *Semina* 10—12, fusca, ovalia.

*Habitat* : Mist belt and River forests of the Middleveld, not of the Lowveld, e.g. at Dukunbane in the Hlabisa District of Zululand, where it is called by the Zulus " uNgwebunkulu " or " inGweb'enkulu " i.e. " The big Foam ", as the bark is pounded in water and worked up by stirring the macerate till they get an overflowing, foamy enema-mixture. It is used against fever, but is a very strong enema. Only a cupful should be used, according to an expert's advice. At Chief Kantini Zulu's Residence in the Melmoth District of Zululand there is another tree of this kind and some other specimens probably around Ngoye forest. It is called there " uNyazangoma ". As the name (isAngoma the witchdoctor) suggests, it is used in witchcraft. But there are at least two kinds of uNyazangoma, viz. a red one, (*Albizzia suluensis*) and a white one which I have not yet seen.

The following specimens are in the different Herbaria :—

*Bayer* 64 (Nat. Herb.); *Gerstner* 4337, Melmoth Distr. 3/11/41, (Nat. Herb.); *Gerstner* 4601, Hlabisa Distr. 20/1/44, (Nat. Herb.); *Gerstner* 1730, Hlabisa Distr. Dec. 1937, (Natal Herb.); *Gerstner* 1714, Hlabisa Distr. 24/11/1935, (Natal Herb.); *Gerstner* 6261, Gwegwede

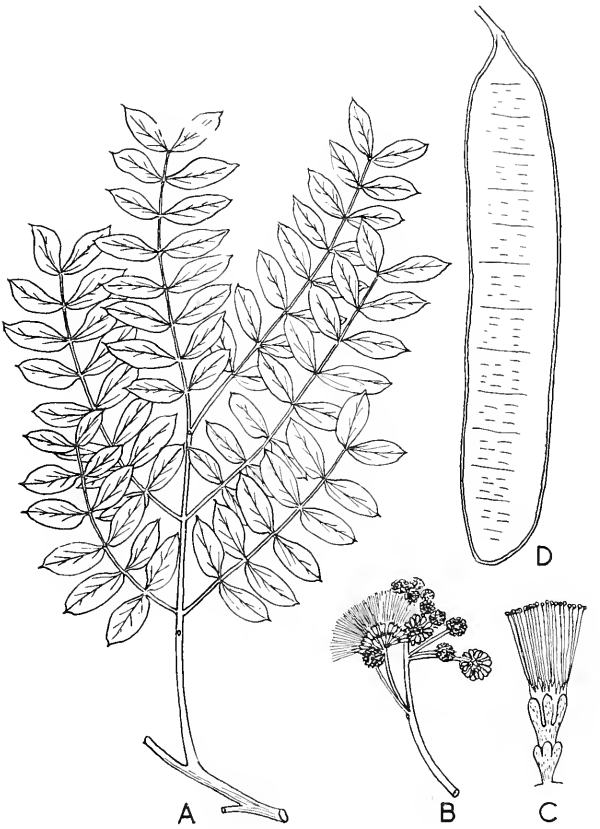



Fig. 6. *Albizzia suluensis*. A. Leaf. B. Inflorescence. C. Flower. D. Legume. *Del.* J. Gerstner. A, B and D, half natural size.

River (Bolus Herb.). 4601, 1714 and 1730 are also in Kirstenbosch Herbarium.

*Albizzia suluensis* is a graceful tree of the closed (Mistbelt and River) forests of the Middleveld. Its general shape resembles that of a peartree.

Its bark is smooth and medium grey. Its trunk is of 1—2 ft. diam. and often 10—15 m. high. The alternate leaves are biparipinnate, about 20 cm. long and 12 cm. broad. The somewhat hairy petioles are 4 or 5 cm. long. There are two conical glands, one on the petiole near the apex, and one between the topmost pinnae. The 3 or 4 pinnae are 8—10 cm. long and about 4cm. broad. The 6—8 pinnulae are more or less oblique, lanceolate and concolorous. The apex of the leaflet is mucronate, and it is acute and oblique at the base. The entire or very minutely crenulate margin is pellucid and on both sides somewhat shiny. The midrib and 6 pairs of veins above are slightly elevated, and on the reverse side more raised. The two stipules soon fall off and are separate and lateral. The apical inflorescences are paniculate and bear 2—5 cream-coloured catkins in each fascicle. They open in succession, usually one at a time. The catkins include about 25 flowerlets and are globose and greenish-yellow when in bud, but hemispherical when fully expanded. The creamy calyx and corolla (4 mm. long and 2 mm. broad) are tomentose and five-lobed. The staminal tube, which is rhubarb-red in colour, and green at the very base, protrudes for about 2 mm. above the corolla ; the filaments (7 mm. long) number about 20 and are irregularly united and cream-coloured. The anthers (0·2 mm. diam.) are globose, the style filiform and not protruding. The greyish yellow legumen, 13—16 cm. long and about 2·5 cm. broad, is oblong and very flat. The 10—12 seeds are brown and oval.

The tree yields a very nice furniture timber, the grain resembling teak and oak with a golden sheen : according to Inspector F. Bayer of Vryheid the heartwood is very durable and tough.

# NOTES ON FICINIA AND DESCRIPTIONS OF FOUR NEW SPECIES.

By Margaret R. Levyns.

The genus Ficinia was established by Schrader in 1832. The name commemorated D. H. Ficini, the author of a Flora of Dresden but as far as can be ascertained he had no special connection either with Cyperaceae or with the Cape flora. Ficinia is a characteristic genus of this flora and the largest genus of Cyperaceae in extra-tropical South Africa. Even in a limited area such as the Cape Peninsula, there are at least thirty-three species, a number which will probably be increased when the genus is better known.

In view of the fact that the forthcoming Flora of the Cape Peninsula is nearing completion it is necessary to give an account of Ficinia with as much accuracy as the present state of our knowledge allows. Several taxonomic groups which at present are treated as single species, will probably need subdivision when more information is available. For example under *F. acuminata* (Steud.) Nees several apparently distinct forms are included. One of these is *F. elongata* Boeck. which may well be a good species but the writer has found so many intermediate forms that in the meantime it seems prudent to regard *F. elongata* as a habitat form of the older species *F. acuminata*. Another species of which the same is true is *F. tristachya* (Rottb.) Nees in which for the time being *F. albicans* Nees is included.

Work on the species of Ficinia on the Cape Peninsula has revealed the necessity for changes of many kinds. Of the thirty-six species listed by Bolus and Wolley Dod two (*F. radiata* Kunth. and *F. Ecklonea* Nees) are removed to other genera, four probably do not occur within the area, and several require changes in nomenclature. The present paper deals with the changes and describes four new species.

**Ficinia subgenus Hemichlaena.**

There are three species in the subgenus Hemichlaena, all occurring on the Cape Peninsula. The most widely distributed species within the area is *Ficinia capillifolia* (Schrad.) C.B.Cl., the only species which is correctly interpreted in the Flora Capensis.

Schrader established the genus Hemichlaena in 1821 for two species, *H. capillifolia* and *H. angustifolia* (Schrad. in Goett. Gel. Anz. iii, p. 2066).

The former species, now transferred to Ficinia, offers no difficulties, but the same cannot be said of *H. angustifolia*. The plant Schrader had in mind is quite clear. In a full description of the species (Schrad. Anal. Fl. Cap. p. 41) he cites under it Ecklon 864. He also gives as a synonym *Schoenus caricoides* Steud., published eight years after the first description of the species. In 1832 Nees adopted unchanged both of Schrader's species (Linnaea VII p. 530). In 1836, however, (Linnaea X p. 129) he added a new species, *Hemichlaena longifolia*, and a new variety *Hemichlaena angustifolia* Schrad. var. *fascicularis*. From Nees' description it is difficult to separate *Hemichlaena longifolia* from *Hemichlaena angustifolia* and it is likely that they are growth forms of the same thing. *Hemichlaena angustifolia* var. *fascicularis* was a plant not hitherto described. It is easily distinguished from the others by having 3—6 spikelets in an inflorescence in place of the usual 1. Kunth in 1837 (Enum. II p. 330) followed Nees fairly closely but stated that the spikelets of *H. longifolia* Nees varied from 1 to 3, whereas Nees had described the species as having solitary spikelets. Steudel in 1855 (Syn. Pl. Glum. II p. 2) made only one change, giving *Hemichlaena angustifolia* var. *fascicularis* specific rank as *Hemichlaena fascicularis*. Clarke (Dur. & Schinz Conspect. Fl. Afr. V p. 635) transferred the species of Hemichlaena to Ficinia but unfortunately misapplied the epithets *angustifolia* and *longifolia*. *Ficinia longifolia* C.B.Cl. is clearly *Hemichlaena angustifolia* Schrad. and if confirmation be needed, it is given by the fact that Clarke quoted under *Ficinia longifolia* Ecklon 864 which was cited by Schrader for *Hemichlaena angustifolia*. *Ficinia angustifolia* C.B.Cl. is *Hemichlaena fascicularis* Steud. As the combination *Ficinia fascicularis* is already in use for a different species, a new name must be found for this species. The epithet *polystachya* is proposed. These two species therefore become :

**Ficinia angustifolia** (Schrad.) Levyns non C.B.Cl.

**Ficinia polystachya** Levyns nom. nov.

## New Species.

**Ficinia rigida,** Levyns sp. nov. (Fig. 1a, b, c, d.).

Herbae perennes rigidae caespitosae. *Folia* ad basin caulis conferta, filiformes. *Spiculae* numerosae congestae. *Bracteae* exteriores foliaceae patentissimae. *Glumae* pallidae costatae mucronatae. *Stylus* brevis. *Nux* obovoidea obtusangula, transverse rugosa. *Discus* nullus vel minutus.

A tufted perennial, 36 cm. high or less, all the vegetative parts rather rigid. Leaves about half as long as the flowering stems ; sheaths brown and sticky, adhering to one another ; ligules short, obtuse ; lamina terete, ribbed. Spikelets crowded, forming a compact globose head, 1 cm. or

more in diam., the two lower braets leaf-like, exceeding the spikelets, standing out more or less at right angles to the stem. Fertile bracts pale dull brown, mueronate, the veins evident. Style very short. Fruit obovoid, brown, trigonous, transversely wrinkled, shortly stipitate. Dise minute or none.

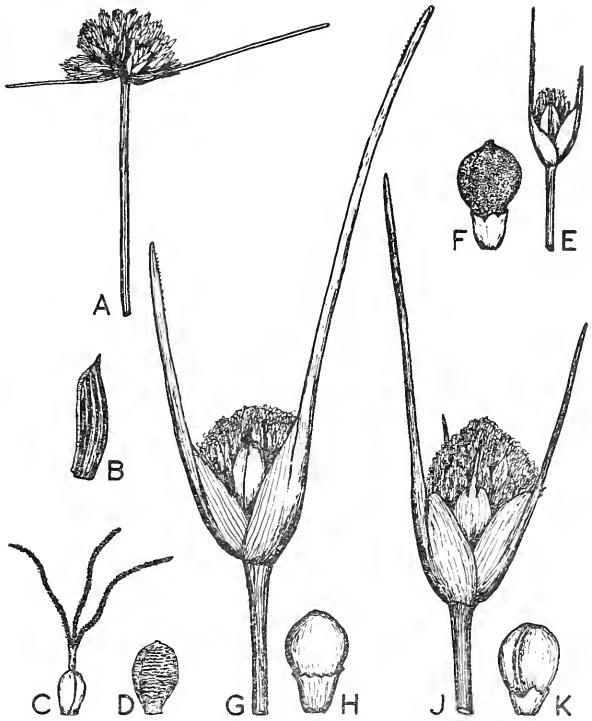



Fig. 1. *F. rigida.* (a) Inflorescence × 2. (b) Fertile bract × 5. (c) Gynoeceum × 5. (d) Fruit × 5. *F. dunensis.* (e) Inflorescence × 2. (f) Fruit × 5. *F. limosa.* (g) Inflorescence. (Drawn from a fruiting head) × 2. (h) Fruit × 5. *F. elatior.* (j) Inflorescence × 2. (k) Fruit × 5.

*Hab.* Cape Province: Cape Division; Sandy places between Smitswinkel Bay and Buffels Bay, *Levyns* 6532. (*Type*, in the Bolus Herbarium). Hout Bay: *Levyns* 7591; Bonteberg: *Levyns* 5425; mountains south of Constantiaberg, *Levyns* 7010. Caledon Division: Palmiet River Mouth: *Levyns* 6013; Betty's Bay: *Levyns* 7667.

*Flowering season* : January to March.

Closely allied to *F. tenuifolia* Kunth. This may be *F. acrostachys* C.B.Cl. but verification is not possible at present. To avoid adding to the existing confusion among the species of Ficinia the writer has created a new species, the fate of which will be decided by subsequent research.

**Ficinia dunensis,** Levyns sp. nov. (Fig. 1e, f ).

Herbae perennes stoloniferae caulibus repentibus firmis gracilibus. *Folia* filiformes. *Spiculae* 1—3. *Bracteae* exteriores foliaceae involucratae. *Glumae* brunneae, mucronatae. *Nux* obovoidea trigona obtusangula brunnea granulosa. *Discus* conspicuus.

Perennial, about 20 cm. high, stoloniferous, bearing leaves and aerial stems in small tufts. Stolons covered with dark brown scales when young, at length naked and wiry. Leaves usually less than half as long as the flowering stems ; the sheaths firm, deep red, truncate ; the blades filiform. Spikelets 1—3, in a compact terminal head, 2—3 mm. in diam., enveloped by 2 sheathing bracts with wide, dark red-brown bases and leafy tips which exceed the spikelets. Fertile bracts mucronate. Fruit obovoid, bluntly trigonous, rough, dark brown. Disc well developed, shortly lobed.

*Hab.* Cape Province : Cape Division ; Sand dunes near Muizenberg cemetery, *Levyns* 6267. (*Type*, in the Bolus Herbarium).

*Flowering season* : August to October.

A characteristic plant of sand dunes and loose sand generally. Allied to *F. indica* (Lam.) Pfeiffer (*F. setiformis* Schrad.) from which it differs in its much smaller heads and its dark wiry stolons.

**Ficinia limosa,** Levyns sp. nov. (Fig. 1g, h).

Herbae perennes stoloniferae caulibus repentibus squamosis demum nudis. *Folia* culmi aequantes vel longiores. *Spiculae* circiter 4, congestae. *Bracteae* exteriores foliaceae, involucratae. *Glumae* pallidae ovatae acutissimae. *Nux* late ellipsoidea obscura obtusangula laevis. *Discus* conspicuus.

A tufted perennial, up to 15 cm. high, stoloniferous. Stolons covered with pale brown scales when young, becoming naked. Leaves as long as or longer than the flowering stems ; sheaths firm, deep red, somewhat oblique at the top ; ligules very small ; blades firm, somewhat flattened at the base, obscurely toothed along the margins. Inflorescence spicate 5—7 mm. in diam., consisting of about 4 crowded spikelets, enveloped by sheathing bracts with reddish bases and green leafy tips, the tips of the two lower bracts far exceeding the spikelets. Fertile bracts ovate, very acute, pale. Fruit broadly ellipsoidal, very obscurely trigonous,

smooth but not shining, pale brown. Disc well developed, shortly lobed.

*Hab.* Cape Province: Cape Division; tidal channels of Paarden Island, locally frequent. *Levyns* 6307. (*Type*, in the Bolus Herbarium).

*Flowering season*: September—October.

Allied to *F. indica* (Lam.) Pfeiffer. Distinguished by its general habit, stolons and fruit.

**Ficinia deusta,** (Berg.) Levyns comb. nov.

In the Flora Capensis Clarke adopted Nees' name of *Ficinia scariosa* for this species. However, there are two earlier epithets, *trigyna* and *deusta*. The combination *Ficinia trigyna* was published by Druce (Rep. Bot. Exch. Cl. 1917) based on *Scirpus trigynus* L. (Mant. II p. 180). However, the epithet *deusta* has priority, having been published as *Schoenus deustus* (Berg. Pl. Cap. p. 10). It is now clearly recognised that Bergius' work antedates the Mantissa of Linnaeus and therefore in conformity with modern rules the plant becomes *Ficinia deusta* (Berg.) Levyns comb. nov.

**Ficinia capillaris,** Levyns comb. nov.

Two very closely allied species of Ficinia occur on the Cape Peninsula. One is correctly named *F. filiformis* (Lam.) Schrad. The other which is common on the lower eastern slopes of Table Mountain, has had the name *F. Bergiana* Kunth. applied to it, but there appears to be no justification for attaching the epithet *Bergiana* to this species. *F. Bergiana* Kunth. (Enum. II, p. 254) was established in 1837 and in the description is said to have rigid leaves whereas those of the plant in question are extremely slender and lack rigidity. The fruit is described as " achenio subrotundo-obcordato, apicato-umbonato, hinc planiusculo, inde convexo-obtusangulo ", which certainly does not apply here where the fruit is acutely trigonous, with all three faces alike. Reference to a small basal disc is equally inappropriate for in this species the disc is large and forms a shallow cup round the base of the fruit. Kunth quotes a specimen of Bergius, said to have come from Kamsbay, a locality which is undoubtedly Camps Bay of to-day, an area from which this species has never been recorded. It therefore seems quite obvious that the plant Kunth described is not the same as that to which the epithet *Bergiana* has become attached in recent times. Fortunately Kunth's description fits another species, *F. tristachya* (Rottb.) Nees, so well that there can be no doubt that *F. Bergiana* Kunth and *F. tristachya* (Rottb.) Nees are the same. This species is common at Camps Bay—a fact which lends support to the view that *F. Bergiana* is a synonym of *F. tristachya*. Only one point needs further comment, namely the small projection on the top of the fruit

described by Kunth. This feature is not usually found in *F. tristachya* but the writer has seen occasional fruits possessing it. Its presence or absence appears to have no particular significance.

Having shown that the name *F. Bergiana* Kunth does not belong to the species under discussion a valid name must be found for it. Under *F. filiformis* Schrad. Nees (Linnaea X p. 173) described a number of varieties. One of these, *F. filiformis* var. *capillaris*, fits this plant. Clarke (Dur. & Schinz Conspect. Fl. Afr. V p. 636) refers to a manuscript name *F. capillaris* Nees which, however, was never published. Therefore it is necessary to raise *F. filiformis* Schrad. var. *capillaris* Nees to specific rank as *F. capillaris* (Nees) Levyns comb. nov.

**F. composita** Nees.

In the Flora Capensis Clarke treats *F. composita* Nees as a synonym of *F. brevifolia* Kunth. In the Bolus Herbarium there are several specimens which were examined by Clarke and which bear notes in his handwriting. One such specimen is Bolus 9212 from Muizenberg named *brevifolia*, with a note added that it " is *F. composita* Nees vera ; not the ' composita ' which Boeckeler has reduced. The present plant Boeckeler never saw. C.B.Cl. Sept. 1888 ". Unfortunately this specimen is not *F. brevifolia* but a typical example of *F. pinguior* C.B.Cl. and matches other specimens which Clarke assigned to *F. pinguior*. A problem therefore arises : which of the two species, *F. pinguior* C.B.Cl. and *F. brevifolia* Kunth, should be regarded as synonymous with *F. composita* Nees ?

*F. composita* was first described as *Hypolepis composita* (Nees in Linnaea VII p. 525). Nees gives a fairly full description and in it refers to the capitulum as " pyramidale, plerumque cernuum ". This fits *F. brevifolia* Kunth but not *F. pinguior* C.B.Cl. The plant on which Nees based his description was collected by Ecklon at a high altitude on Table Mountain. *F. brevifolia* is common on Table Mountain but there are no records of *F. pinguior* for this locality. A few years later Nees published a list of Cape members of Cyperaceae (Linnaea IX p. 292) and in this we find both *F. composita* Nees and *F. brevifolia*. The latter species was never described by Nees and shortly afterwards (Linnaea X p. 172) when he described all the species of Ficinia known to him, he dropped *F. brevifolia* but retained *F. composita*, giving Lion's Mountain and Tulbagh waterfall as additional localities for the species. This species may still be found in these localities but *F. pinguior* does not occur in either of them. At this stage Nees dropped all the synonyms which he had quoted in his first account of the species. That this omission was intentional may be judged by the fact that he quoted two of the synonyms under other species. In 1837 Kunth (Enum. II p. 260) retained *F. brevifolia* and

*F. composita*, giving Nees as the authority in both cases, wrongly so in the case of the former. All subsequent muddles date from this time. Clarke accepted *F. brevifolia* Kunth and included *F. composita* Nees as a synonym, a proceeding for which there is no justification. Thus it becomes clear that the species cited by Clarke in the Flora Capensis as *F. brevifolia* Nees should be *F. composita* Nees. *F. pinguior* C.B.Cl. is a distinct species which occurs in sandy places along the coastal belt from the Cape Peninsula to the Caledon Division. The following specimens examined by Clarke may be cited as this species :— Bolus 1396, Bolus 9212 (both from Muizenberg) : Schlechter 10425, Vogelgat : Wolley Dod 2803, Simonstown. Clarke's comments on Bolus 9212 to which reference has been made, may be regarded as due to an error of judgment.

**Ficinia elatior,** Levyns sp. nov. (Fig. 1j, k).

Herbae perennes robustae caespitosae. *Folia* rigida, canaliculata, culmo dimidio breviores. *Ligulae* nullae. *Spiculae* numerosae congestae. *Bracteae* exteriores foliaceae, involucratae. *Glumae* sanguineae mucronatae. *Nux* obovoidea, trigona, atro-brunnea, fere laevis. *Discus* conspicuus.

A perennial, about 40 cm. high, lacking stolons. Rhizomes woody, closely branched, covered with firm brown scales. Leaves rigid, about half as long as the flowering stems ; the sheaths usually mahogany-red below, paler above, truncate ; ligules none ; blades channelled, the margins scabrous. Inflorescence a densely crowded compound spike, ovoid, 1 cm. wide or more, enveloped by the wide reddish bases of the lower sheathing leafy bracts, the tips of the lower bracts exceeding the spikelets. Fertile bracts sharply mucronate, deep red. Fruit obovoid, trigonous, deep brown, the faces almost smooth. Disc well developed, shortly lobed.

*Hab.* Cape Province : Cape Division ; streamsides, flats between Bonteberg and Klasjagersberg, Cape Peninsula, *Levyns* 5944. (*Type* in the Bolus Herbarium).

*Flowering season* : August—December.

Allied to *F. lithosperma* Boeck. but stouter and with reddish instead of green bracts. *F. lithosperma* flowers from March to July.

# TETRARIA AND RELATED GENERA, WITH SPECIAL REFERENCE TO THE FLORA OF THE CAPE PENINSULA.

By Magaret R. Levyns.

The family Cyperaceae is well represented in the flora of the Cape Peninsula, and members of the sub-family Rhynchosporoideae (Schoeneae of Clarke) are to be found in a variety of habitats. All nine genera recorded in the Flora Capensis occur within the area. The inclusion of one, Rhynchospora, is based on a specimen collected by Ecklon on Table Mountain. Another, Cladium, represented by one species, is somewhat infrequent and is only found close to the margins of permanent vleis on the Cape Flats. The remaining seven genera are common. Recent work on the family has resulted in information that necessitates changes either in nomenclature or in generic definitions, and the purport of this paper is to deal with the problems which have arisen.

Tetraria is the largest genus and no understanding of the group of genera is possible without a more complete knowledge of this very important genus than has been available in the past. Most previous work has been done on a limited number of herbarium specimens and the plasticity of several of the species was therefore not recognised. However, before embarking on an account of recent additions to our knowledge, it is necessary to know something of the history of this genus, the very name of which is a puzzle to the uninitiated.

Tetraria was founded in 1812 by Palisot de Beauvois on a specimen collected at the Cape of Good Hope by du Petit-Thouars. This he named *Tetraria Thuarii* in honour of its discoverer. In 1819 a second species, *Tetraria compar*, was transferred to the genus by Lestiboudois. Towards the end of last century Clarke extended the genus so as to include thirty-one additional species, a few of them new, but for the most part species which had hitherto been placed in other genera. Since then several new species have been added, bringing the total number to forty-four.

In the course of field work during the last ten years it soon became apparent that the definition of Tetraria given by Clarke in the Flora Capensis, is insufficiently elastic to embrace all possible variations of the spikelet. Two ways of dealing with the problem are open. One is to break up the genus once more into a number of smaller genera. The

other is to retain the genus much as it is at present and amend the description. The writer has decided to follow the latter course as although the genus is not easy to define, the constituent species form a coherent whole with two exceptions. One of these is *Tetraria punctoria* C.B.Cl. No single feature will separate it from Tetraria but the sum of its differences is sufficient to place it apart. In this species several reduced leaves are found at the base of each flowering stem, only the uppermost developing a lamina, which is cylindrical and indistinguishable from a stem. The bracts of the spikelet are not definitely 2-ranked as they are in most species of Tetraria. The very long perianth bristles are unlike those of any Tetraria, so too is the unusually long style terminating in six branches. In the past this species was placed in a separate genus, *Buekia punctoria* Nees but unfortunately the generic name had been used earlier for an entirely different plant and therefore is not available under modern rules of nomenclature. It is therefore proposed to establish a new name for this genus, NEESENBECKIA, in commemoration of Nees von Esenbeck who made outstanding contributions to the knowledge of South African Cyperaceae during the early years of last century. The name of this plant therefore becomes *Neesenbeckia punctoria* (Vahl.) Levyns.

1834
Gieseke 179

Some initial difficulties with regard to Tetraria present themselves at once. First of all the description in the Flora Capensis of the type species, *T. Thuarii* Beauv., does not agree with the original description of Palisot de Beauvois. Secondly there is considerable doubt about the type species itself of which there are no clear records. Such evidence as has been brought to light in the course of these researches is given below. *T. Thuarii* Beauv. was first described in a periodical not accessible in South Africa (Mém. Sc. Nat. et Phys. de l'Inst. Imp. France). Through the kind assistance of the Director of Kew the writer was able to obtain an extract from the journal. In view of what follows it seems worth while to quote the passage in full.

> " Dans le nombre des plantes que M.du Petit-Thouars a rapportées de ses voyages, et qu'il m'a communiquées, en me permettant d'en faire usage, quoiqu'il ne les eût pas encore publiées, il est une extrêmement remarquable, qu'il a trouvée au cap de Bonne-Espérance. Cette plante, ainsi que M.du Petit-Thouars l'avait remarqué, avant moi, sur les lieux et sur des individus frais, porte dans chaque épi trois sortes de fleurs. Les plus inférieures, munies seulement d'une bractée ou écaille, sans aucun organe de la génération ; les intermédiaires, ayant également une bractée, quatre étamines, un ovaire surmonté d'un style et de quatre stigmates, mais qui avorte pour l'ordinaire ; enfin, la dernière terminale, composée d'une bractée, d'une paillette mince et membraneuse, de huit étamines, d'un style bulbeux à sa

base, divisé en deux, subdivisé en quatre stigmates, et le fruit à quatre angles très-saillants, entre chacun desquels se trouvent deux étamines geminées, ce qui en porte le nombre à huit, multiple de quatre. Je dois faire remarquer en passant, que cette singulière organisation dan la famille des Cypérées, a quelque analogie avec celle que M.du Petit-Thouars a remarquée dans la correspondance du nombre des étamines, du style et des stigmates dans les Polygonées, observation très-curieuse qu'il a communiquée à la Classe, dans un mémoire dont M.Desfontaines, notre confrère, lui a dernièrement rendu compte.

Certains caractères de cette plante pourraient la faire prendre pour le *Schoenus compar* des auteurs ; mais le nombre des stigmates, celui des angles du fruit, ainsi qu'on peut s'en assurer par la description et la figure de Rottboel, empêcheront tourjours de la confondre.

La connaisance de ce nouveau genre, que je propose de nommer *Tetraria*, à cause de ses étamines, tantôt au nombre de quatre, tantôt de huit, qui est le multiple de quatre, de ses quatre stigmates, et de son fruit à quatre angles, et pour nom specifique, *Thuarii*, afin de perpetuer le nom du Botaniste à qui la science en est redevable; la connaissance de ce genre, dis-je, prouve evidemment que dans le Cypérées, le nombre des stigmates n'est pas aussi indifferent qu'on avait pensé, et que ce nombre étant généralement égal à celui des angles du fruit, fournit un caractère constant, naturel, et d'autant plus avantageux pour la formation des genres, que, ceux déja institués, et qui renferment des espèces à deux et à trois stigmates, sont très-nombruex et, par conséquent, tres-difficiles pour la détermination et l'étude des espèces."

The salient points in the foregoing account may be summarised as follows :—

1. The specimen was given to Palisot dc Beauvois by M.du Petit-Thouars.
2. It came from the Cape of Good Hope.
3. There is no description of any part of the plant but the inflorescence.
4. The stamens and styles are in multiples of four but in other respects it resembles *Schoenus compar* L.

Du Petit-Thouars was a well known French savant of his day. An account of his travels is given in Musée Botanique Delessert by Lasègue (1845) p. 437, and here we learn that he only spent a fortnight at the Cape during the summer months 1792-93, while on the way to Mauritius. Travelling in those days was slow and difficult and it seems highly improbable that a botanical explorer whose short stay was only an incident

on an expedition which did not have South Africa as one of its objectives, would move far from the coast with its rich and varied flora during his fortnight on land. This is of considerable importance for all the specimens identified as *Tetraria Thuarii* by C. B. Clarke came from remote inland localities.

An interval of about twenty years elapsed between the time the specimen was collected and its description by Palisot de Beauvois. The fact that the latter makes no mention of any of the vegetative parts suggests that these were not seen when the description was drawn up and that the type specimen was probably imperfect. This point is of some importance for the location of the type specimen is not known and it appears likely that a specimen consisting of an inflorescence only which was part of the herbarium of Palisot de Beauvois and is now at Geneva, is actually the type. This specimen was collected by du Petit-Thouars in whose own herbarium in Paris the species is not represented. Unfortunately there are a few features connected with this presumed type which make a definite decision difficult. There is an old label pasted on the sheet which bears a short diagnosis which does not agree with either the description of Palisot de Beauvois or the two dissected spikelets which are in an envelope attached to the sheet. The spikelets fit the published description reasonably well though each spikelet appears to have three flowers instead of two as recorded. On the envelope containing the dissections is written in a handwriting distinct from that which penned the diagnosis, *Tetraria Thuarii*. On the label is a statement that the plant came from " insula Borboniae ". There is no doubt about the plant itself which is *Tetraria compar* (L.) Lestib., a characteristic Cape plant of which there are no records other than this, outside South Africa. Its distribution within South Africa is limited to part of the south western coastal belt, and it is therefore extremely unlikely that it is also present on an island as remote as Reunion. In view of the fact that the label on which this puzzling record is given, is not a field label the writer suspects that du Petit-Thouars himself wrote the label including the diagnosis, after his return to France and in error gave the wrong locality. In that case the envelope with the dissections and the name *Tetraria Thuarii*, was probably added by Palisot de Beauvois when he described the species. In 1895 a further label was attached to the sheet by C. B. Clarke identifying the plant quite correctly as *Tetraria compar* Lestib. Clarke evidently did not regard this as the type of *Tetraria Thuarii* for his description of that species is entirely different from that of Palisot de Beauvois and refers to another species altogether.

For the reasons given above the writer considers that the specimen collected by du Petit-Thouars and now in Geneva is probably the type.

The supposition that the type of *Tetraria Thuarii* came from somewhere on or not far from the Cape Peninsula is strengthened by Beauvois' statement that it resembles *Schoenus compar*, only differing in the fact that its floral parts are in fours. *Schoenus compar*, now *Tetraria compar*, is a very common plant on the Cape Peninsula and has proved to be the most variable species in the genus. In the majority of cases perianth bristles are lacking though in a number of flowers either small lumps or minute, delicate bristles have been observed by the writer. No flower has ever been seen with conspicuous bristles. It is noteworthy that Beauvois does not mention bristles, while Clarke in the Flora Capensis gives as a feature of *T. Thuarii* 5—6 scabrous bristles, rather longer than the nut. There is no doubt at all that this is an accurate reflection of Clarke's conception of the species for in his Illustrations of Cyperaceae (Tab. XCII. 3, 4) he shows a plant in which the bristles are an outstanding feature. *Tetraria compar* has a variable number of stamens (3—8), and the number of style branches may be either 3 or 4. The numbers are not constant in different flowers of the same spikelet as may be seen from the table on p. 79. In du Petit-Thouars' presumed type all the flowers examined by Beauvois had their parts in fours, and thus a new genus was created, based on a supposed numerical constancy which has proved to be non-existent. The fact that the name of a genus is unsuitable is no reason for discarding it according to the rules of nomenclature, and thus we find Tetraria legitimately established for a group of species in which the number four is exceptional. *T. compar* is the only species in the genus which will fit Beauvois' description, and there can be little doubt that it is the type species. As the epithet *compar* is older than *Thuarii*, *T. Thuarii* Beauv. becomes a synonym of *T. compar* (L.) Lestib.

The sinking of *T. Thuarii* Beauv. in *T. compar* Lestib. necessitates the re-naming of *T. Thuarii* C.B.Cl. non Beauv. On a recent botanical expedition the writer was fortunate in finding this species growing along an irrigation furrow in the mountains close to Citrusdal in the Clanwilliam district. The plants collected fit Clarke's description (Fl. Cap. VII p. 283) and figures (Illustr. Cyp. Tab. XCII 3, 4). They also match the following specimens :— Schlechter 7512 (Bolus Herb. and Herb. Delessert), and Wallich, Ecklon & Zeyher 106, Drège (Herb. Delessert). These were placed by C. B. Clarke under *Tetraria Thuarii*. A careful examination soon showed that the species is closely allied to *Macrochaetium hexandrum* (see p. 80) and it is therefore proposed to remove it from Tetraria. The earliest name given to this species is *Cyathocoma Ecklonii* (Nees in Linnaea X p. 195) and it therefore becomes *Macrochaetium Ecklonii* (Nees) Levyns comb. nov.

In common with all other genera of the sub-family to which Tetraria belongs, it has spikelets of a cymose type. In the majority of species the spikelet consists of several distichous bracts, only the two uppermost of which are fertile. The lower flower is functionally male with an abortive gynoeceum, the upper bisexual. The number of stamens in both flowers is three, and the number of style branches is also three. Clarke recognised only two species consistently not in agreement with the above definition : *T. cuspidata* and *T. crinifolia*. In the former there is only one flower in the spikelet while in the latter the spikelets are unisexual, those in the upper part of the plant being male, those lower down female. There can be little doubt that Clarke was right in including both these species in Tetraria. The problems which arise in connection with *T. cuspidata* will be dealt with later in this paper for it is now quite clear that *T. cuspidata* sensu C.B.Cl. is a group of species. At this point it is significant to note that plants have been found in which spikelets on the same individual sometimes have one flower, sometimes two as in a typical Tetraria. In *Tetraria variabilis*, a new species which is described below, the spikelets have one flower only as in *Tetraria cuspidata* but the spikelet may be either bisexual or male. Occasionally in this new species a plant may be found bearing male spikelets only. These, however, are not the only species showing a departure from the normal spikelet. *T. flexuosa* C.B.Cl. frequently has both flowers bisexual and fertile, while occasionally spikelets may be found with two male flowers below the bisexual flower. In several other species exceptional spikelets have been recorded from time to time. The most variable species is *T. compar* Lestib. which, as has been shown, is almost certainly the type species of the genus. The number of flowers in the spikelet ranges from two to four, three being the most common number under normal circumstances. However in very vigorous plants such as appear after a veld fire, four flowers are often found. Comparatively few spikelets have only two flowers. In a small number of cases a sterile bract has been noted above the flowers. Variability in *T. compar* is not confined to numbers of flowers but extends also to their relative positions in the spikelet and to the number of stamens and style branches. These features are illustrated in the following table which is based on spikelets selected at random from plants in a given area and from plants in different localities. In a few cases all the spikelets in an inflorescence were dissected and here too the same variability was encountered. About one hundred spikelets have been dissected and the table has been drawn up from representative spikelets so as to give as accurate a picture as possible.

It will be noted that the writer has not seen any flowers with eight stamens among the plants collected by her, seven being the highest

TABLE.

| Locality from which the Specimen was Collected. | Flower 1. | | | Flower 2. | | | Flower 3. | | | Flower 4. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Type | Stamens | Styles | Type | Stamens | Styles | Type | Stamens | Styles | Type | Stamens | Styles |
| Summit of Table Mountain | Male | 4 | 3 | Male | 6 | 4 | Bisexual | 4 | 4 | — | — | — |
| | ,, | 5 | 3 | ,, | 6 | 4 | ,, | 6 | 3 | — | — | — |
| | ,, | 7 | 3 | ,, | 4 | 4 | ,, | 4 | 4 | — | — | — |
| | ,, | 6 | 3 | ,, | 5 | 4 | ,, | 4 | 4 | — | — | — |
| | ,, | 6 | 3 | Bisexual | 5 | 4 | — | — | — | — | — | — |
| Smitswinkel Bay (After Fire) | Male | 4 | 3 | Male | 3 | 3 | Bisexual | 4 | 3 | Male | 4 | 3 |
| | ,, | 5 | 3 | ,, | 3 | 3 | Male | 3 | 3 | Bisexual | 4 | 3 |
| | ,, | 5 | 3 | ,, | 3 | 3 | ,, | 4 | 3 | ,, | 4 | 3 |
| | ,, | 4 | 3 | ,, | 4 | 3 | Bisexual | 4 | 3 | Male | 3 | 3 |
| | ,, | 4 | 3 | ,, | 4 | 3 | Male | 4 | 3 | Bisexual | 4 | 3 |
| Camps Bay .. .. .. | Male | 6 | 3 | Male | 5 | 3 | Bisexual | 4 | 3 | — | — | — |
| | ,, | 7 | 3 | Bisexual | 6 | 3 | — | — | — | — | — | — |
| | ,, | 6 | 3 | ,, | 6 | 3 | — | — | — | — | — | — |
| Camps Bay (After Fire) .. | Male | 6 | 3 | Male | 4 | 3 | Male | 4 | 3 | Bisexual | 3 | 3 |
| | ,, | 6 | 3 | ,, | 5 | 3 | ,, | 3 | 3 | ,, | 4 | 3 |
| | ,, | 4 | 3 | ,, | 5 | 3 | Bisexual | 4 | 3 | — | — | — |
| | ,, | 4 | 3 | ,, | 5 | 3 | Male | 5 | 3 | Bisexual | 4 | 3 |
| | ,, | 4 | 3 | ,, | 5 | 3 | Bisexual | 4 | 3 | — | — | — |
| Kirstenbosch .. .. .. | Male | 4 | 4 | Bisexual | 7 | 4 | — | — | — | — | — | — |
| | ,, | 4 | 4 | ,, | 5 | 3 | — | — | — | — | — | — |

Table illustrating the variability of the spikelet in *Tetraria compar.* The term " male " is used to indicate a flower in which the gynoeceum is without function. Flower 1 is the lowest flower in the spikelet.

number. However, eight stamens have been recorded by other workers. No spikelet dissected up to the present is an exact match of that of Beauvois' type species which was stated to have two flowers, the lower with four stamens and four styles, the upper with eight stamens and four styles. A glance at the table will show that these conditions are very nearly satisfied by one of the Kirstenbosch spikelets, and it comes well within the bounds of probability that an exact match will eventually be found.

With *Tetraria punctoria* C.B.Cl. removed to *Neesenbeckia*, *T. triangularis* C.B.Cl. is the only remaining species found on the Cape Peninsula, showing a departure from the typical spikelet. In *T. triangularis* the flowers are normal in their number and position but the stamens vary from six to eight and the style branches from seven to nine.

The facts given above make it apparent that Tetraria is a genus which does not lend itself to a precise definition such as that given by Clarke in the Flora Capensis. In spite of these difficulties the fact remains that Tetraria is a natural group of species and the genus is well worth upholding. Widening the scope of Tetraria at once introduces difficulties in the definition of certain other genera which will now be considered.

Macrochaetium is a genus founded by Steudel for a species which has suffered more than a normal share of vicissitudes. It was first authentically published as *Carpha hexandra* Nees. (Linnaea X p. 193, 1835-6). About a year later it became *Ideleria Neesii* Kunth. In 1845 it was once more described as *Elynanthus Kraussii* Hochst. In 1855 it became *Macrochaetium Dregei* Steud., a name which was later used by Clarke in the Flora Capensis. In 1874 *Cyathocoma Neesii* Boeck. was added to the list. The adoption of International rules of nomenclature led to still further changes and in the past twenty years the same plant has been named *Ideleria hexandra* Pfeiffer, *Macrochaetium hexandrum* Pfeiffer and *Macrochaetium Neesii* Kükenthal. A wide choice of names is therefore available. *Macrochaetium hexandrum* (Nees) Pfeiffer is the correct name for the type species under modern rules of nomenclature. Kukenthal (Cyperaceae novae vel minus cognitae X, Fedde Rep. XXIX p. 187, 1931) claimed that the epithet *hexandrum* was not legitimate but he over ooked the fact that although Nees first published *Carpha hexandra* without a description, he subsequently remedied the defect.

The genus is undeniably very closely allied to Tetraria, and future research may lead to its incorporation in that genus. With our present imperfect knowledge of this group of plants it seems desirable to retain Macrochaetium in the meantime. As in the case of certain species of Tetraria *Macrochaetium hexandrum* too shows considerable variability in its spikelet. Usually there are two flowers, one male with an abortive

gynœceum, the other bisexual, but the relative positions are not fixed. In about half the two-flowered spikelets examined the arrangement is as in Tetraria but in the other half the bisexual flower occurs below the male. Occasionally spikelets are found with only one flower which is bisexual. Less often the rudiments of a third flower are to be found above the other two. In view of the range of structure exhibited in the spikelet of *Tetraria compar* and others it becomes impossible to separate Macrochaetium from Tetraria on the positions and numbers of its flowers. However, the spikelet has fewer bracts than is usual in Tetraria and they are more or less spirally arranged. There are six rather long perianth bristles and six stamens. Taken together these characters support the view that Macrochaetium is sufficiently distinct from Tetraria to warrant generic rank.

A genus which approaches Macrochaetium closely is Asterochaete. The species which belong to this genus are placed under Carpha in the Flora Capensis. However they are confined to southern Africa and on floral structure they merit their separation from Carpha. The name Asterochaete, originally given by Nees is therefore adopted. The spikelet approaches that of Macrochaetium closely but differs externally in its two-ranked green bracts. There are two flowers both of which may be bisexual though the upper is frequently male with an abortive gynoeceum. The perianth bristles are much stouter than those of Macrochaetium and it has only three stamens whereas Macrochaetium has six. Two species occur on the Cape Peninsula, *A. glomerata* (Thunb.) Nees and *A. capitellata* Nees.

Closely linked with Asterochaete is Trianoptiles which, as has been shown previously, (Levyns : Journ. S.Af. Bot. IX, p. 21, 1943) differs in having, in addition to the normal aerial spikelets, some basal which are female and produce tuber-like fruits. This feature, added to differences in the perianth, serve to separate the genus from its allies. No changes are necessary in the two remaining genera, Schoenus and Epischoenus, though the number of species in the latter growing on the Cape Peninsula has risen from one to three. Some new species are described in Journ. S. Af. Bot. XIII, pp. 53-58, 1947.

Work on the Tetrarias of the Cape Peninsula has shown that the genus is far better represented in the area than was formerly supposed. Bolus and Wolley Dod in the list compiled in 1904 recorded seventeen species of which seven had not been seen by them. Two of these, *T. Bolusii* and *T. Wallichiana*, have not been found by the present writer and it seems probable that neither occurs within the area. *T. rottboellioides* C.B.Cl. is, in the writer's opinion, a form of *T. bromoides* (Lam.)

Pfeiffer formerly known as *T. Rottboellii* C.B.Cl. This and the removal of *T. punctoria* to a separate genus, Neesenbeckia, reduces the number of species to thirteen. However, three species not previously recorded from the area have been found, viz. :— *T. crinifolia* C.B.Cl., *T. capillacea* C.B.Cl. and *T. brevicaulis* C.B.Cl. The last named species is identified as *Costularia brevicaulis* C.B.Cl. in the Flora Capensis but it is a typical Tetraria with close affinities to *T. eximia* C.B.Cl. and *T. thermalis* C.B.Cl. Clarke had previously placed this plant in Tetraria but evidently later failed to find the abortive gynoeceum in the lower flower. In the writer's experience this is always present and the species now reverts to the genus in which it was originally placed. There are ten new species of Tetraria about to be described, bringing the total up to twenty six.

A peculiar feature of many species is the slow rate at which the inflorescence develops. Sometimes months elapse between the time when the spikelets are formed and the time at which the reproductive structures within mature. This peculiarity accounts for the very large number of immature spikelets which one encounters in herbarium material. Another peculiarity is that bracts which when young are aristate, later shed their needle-like points so that inflorescences collected at different times from the same plant may have a totally different appearance. There can be little doubt that a species such as *T. aristata* C.B.Cl. is merely a youthful form of some other species.

*T. cuspidata* sensu C.B.Cl. is clearly a group of species the separation of which presents innumerable difficulties. When the scope of the present enquiry is extended to South Africa as a whole, clues may present themselves. All that is attempted here is to describe as new species those forms which field experience, extending over more than ten years, has shown to be distinct in several definite characteristics, both morphologieal and ecological. The new species are as follows :— *T. graminifolia*, *T. exilis*, *T. autumnalis*, *T. crassa*, *T. variabilis*, *T. paludosa* and *T. compacta*. Two of these have previously been given sub-specific rank by Kükenthal (loc. cit.), viz. :— *T. crassa* as *T. cuspidata* forma *robustior*, and *T. exilis* as *T. cuspidata* forma *gracilis*. The epithet *cuspidata* is being retained for a common species which agrees well with Rottboell's figure (Descr. et Ic. 66 t. 18 Fig. 3). Unfortunately no flowers or fruit are depicted but the author has little doubt that this species, of which an emended description is given below, is the plant which was originally described as *Schoenus cuspidatus*.

The separation of seven new species from the *cuspidata* group still leaves many problems unsettled. For example considerable variability was observed in what a first sight appeared to be a normal community of *T. cuspidata*, regenerating after a fire on the slopes of Kapitein's Peak at Hout Bay. It is possible that the aberrant forms are merely a temporary

expression of the effects of burning and that the plants will in due course revert to normality. A single case will suffice to show that this view is possible. One plant had long, slender straight leaves superficially very different from the short, often curled leaves of typical *T. cuspidata*. Otherwise it was perfectly normal. In Ficinia, another very common Cyperaceous genus, the same phenomenon has been observed in two cases. In *Ficinia elongata* Boeck. and *Ficinia brevifolia* Kunth. species which normally have a rudimentary lamina, well developed leaves appear temporarily after a fire but in due course the plants revert to the normal, almost leafless condition. Cases of parallel variation in allied species or genera are a commonplace to field workers. The writer is of the opinion that if a particular stimulus can induce unusually vigorous leaf development in one genus, then with the same stimulus similar results may be expected in other genera within the same circle of affinity. The fact that the effects noted are of temporary duration does not affect the point at issue.

In view of our incomplete knowledge of these members of Cyperaceae the present account must be regarded merely as a preliminary contribution to the study of an exceedingly difficult group.

**Tetraria cuspidata,** (Rottb.) C.B.Cl. emend. Levyns.

A densely tufted perennial about 60 cm. high. Leaves all basal, usually much less than half the length of the flowering stems, very slender and wiry : the sheath dark red, firm : the lamina flat at the base but curved to form a shallow channel, the margin beset with short, stiff hairs, soon becoming rather solid and grooved, ultimately terete : the ligule firm, shortly 2-lobed, the lobes obtuse (Fig. 1a). Aerial stems slender, bearing numerous dark brown spikelets in a not very much contracted panicle. Bracts similar to the leaves, the lower overtopping inflorescence. Spikelets 6 mm. long or a little less, broadly lanceolate, 1-flowered, the bracts 2-ranked. Bracts about 7, the lower cuspidate, the upper acute. (Fig. 2a). Perianth bristles none. Stamens 3. Style scarcely any, the 3 branches arising at the apex of the conical beak. (Fig. 3a). Fruit broadly ellipsoidal, trigonous, with a well developed hispid beak. (Fig. 3b).

*Flowering season* : August to November.

## Descriptions of New Species.

**Tetraria compacta,** Levyns sp. nov.

*T. cuspidata* (Rottb.) C.B.Cl. affinis sed foliis longioribus, rigidioris, spiculis flavo-brunneis, confertis, stylis elongatis differt.

A densely tufted perennial, 60 cm. high or less. Leaves basal, usually at least half as long as the flowering stems, much more rigid than in *T. cuspidata* : the sheath dark red, firm : the lamina flattened and

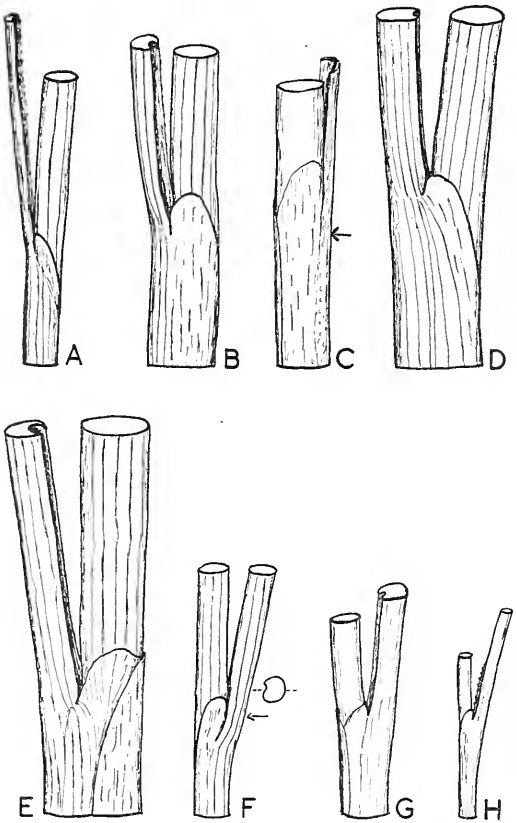



FIG. 1. Base of the lamina and top of the sheath, showing ligule and portion of the flowering stem. (a) *T. cuspidata*, (b) *T. compacta*, (c) *T. graminifolia*, (d) *T. paludosa*, (e) *T. crassa*, (f) *T. variabilis*, (g) *T. autumnalis*, (h) *T. exilis*. An arrow indicates the level at which the ligule becomes free from the lamina in two cases. All × $2\frac{1}{2}$.

shallowly channelled at the base, the margin beset with short stiff hairs, becoming solid and grooved shortly above the ligule, ultimately terete : the ligule firm, 2-lobed, the lobes obtuse, rather larger than those of

*T. cuspidata*. (Fig. 1b). Aerial stems slender, bearing numerous yellow-brown spikelets in a much contracted panicle. Bracts similar to the leaves, rigid, the lower overtopping the inflorescence. Spikelets about 7 mm. long, lanceolate, 1-flowered, the bracts 2-ranked. Bracts about 7, all excepting the uppermost cuspidate. (Fig. 2b). Perianth bristles none. Stamens 3. Style at least as long as the ovary, sometimes longer, with 3 branches. Fruit broadly ellipsoidal, trigonous, with a well developed hispid beak. (Fig. 3c).

*Hab.* Cape Province: Cape Division; Bushy places on the lower mountain slopes, Kirstenbosch, *Esterhuysen* 11808. (*Type*, in the Bolus Herbarium).

*Flowering season*. August to November.

**Tetraria graminifolia,** Levyns sp. nov.

*T. cuspidata* (Rottb.) C.B.Cl. affinis sed foliis longis, gramineis, spiculis pallido-brunneis, bracteis paleaceis, ovariis stipitatis, stylis elongatis differt.

A densely tufted grass-like perennial, about 40 cm. high. Leaves all basal, numerous, slender, pale green, about as long as the flowering stems: the sheaths firm, reddish brown at the base, paler above: the lamina flat, slightly channelled, becoming more deeply channelled higher up, margins in the upper part scabrous: the ligule scarcely membranous, 2-lobed, the lobes obtuse. (Fig. 1c). Aerial stems slender, with many spikelets in a much contracted panicle towards the apex. Bracts on the main stem leaf-like, far exceeding the spikelets. Spikelets about 7mm. long, pale brown, chaffy, the bracts 2-ranked, 1-flowered. Bracts 5—6, the lower aristate, the upper obtuse. (Fig. 2c). Perianth bristles reduced to 3 minute lumps alternating with the stamens. Stamens 3. Ovary shortly stipitate, the style longer than the ovary, conical at the base and hispid, style branches 3. (Fig. 3d). Fruit ellipsoidal, trigonous, the cell outlines in longitudinal rows visible on each face, the beak inconspicuous and wrinkled. (Fig. 3e).

*Hab.* Cape Province: Cape Division; On the western slopes below Lion's Head, from 600 to 1,200 ft., *Levyns* 7917. (*Type*, in the Bolus Herbarium).

*Flowering season*: July to November.

**Tetraria paludosa,** Levyns sp. nov.

*T. cuspidata* (Rottb.) C.B.Cl. affinis sed major, foliis longioribus, latero-complanatis, nucibus majoribus, angustioribus differt.

A densely tufted perennial about 1 m. high. Leaves all basal, rather

stout, about half the length of the flowering stems : the sheath firm, dark red : the lamina channelled at the base, soon becoming laterally compressed : the ligule short, the 2 lobes not apparent. (Fig. 1d). Aerial stems robust, bearing numerous spikelets in a contracted panicle. Bracts

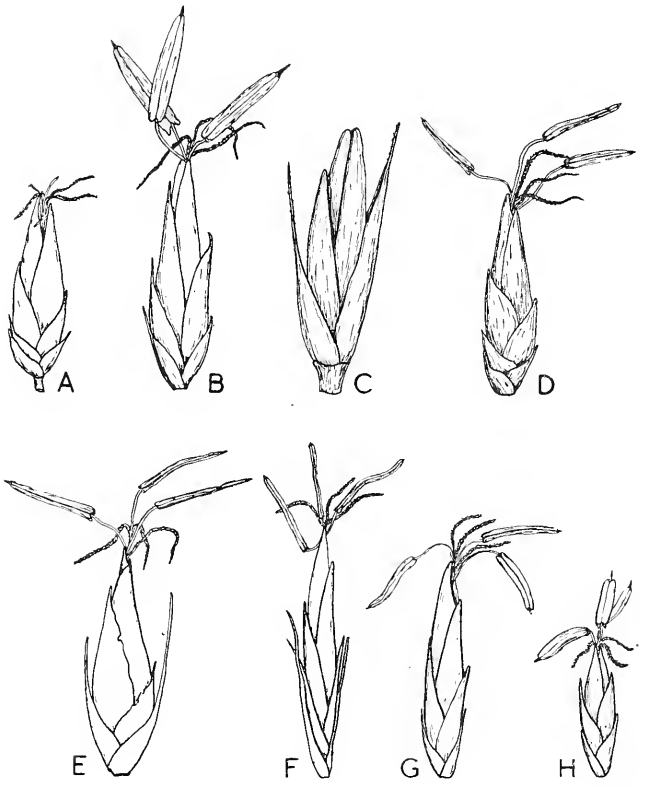



Fig. 2. Spikelets. (a) *T. cuspidata*, (b) *T. compacta*, (c) *T. graminifolia*, (d) *T. paludosa*, (e) *T. crassa*, (f ) *T. variabilis*, (g) *T. autumnalis*, (h) *T. exilis*. All × 2½.

similar to the leaves, the lower overtopping the inflorescence. Spikelets about 6 mm. long, lanceolate, 1-flowered, the bracts 2-ranked. Bracts about 7, the lower shortly cuspidate, the upper obtuse or nearly so. (Fig. 2d). Perianth bristles none. Stamens 3. Style short with 3 branches. Fruit ellipsoidal, trigonous, with a shortly hispid beak. (Fig. 3f).

*Hab.* Cape Province : Cape Division ; Marshy places near a stream above Camps Bay, *Levyns* 7915. (*Type*, in the Bolus Herbarium). *Pillans* 4864, collected on damp ground near a stream at Hout Bay, is this species.

*Flowering season* : August to November.

**Tetraria crassa,** Levyns sp. nov.

*T. cuspidata* (Rottb.) C.B.Cl. affinis sed robustior, foliis majoribus, teretibus vel paulum complanatis, spiculis longioribus, stylis conspicuis differt.

A robust tufted perennial about 60 cm. high. Leaves all basal, rather more than half the length of the flowering stems : the sheaths firm, brown, with a reddish tinge at the base : the lamina stout, channelled at the base, becoming terete, eventually somewhat flattened : the ligule 2-lobed, the lobes obtuse. (Fig. 1e). Aerial stems robust bearing numerous spikelets in a contracted panicle. Bracts leaf-like, the lower overtopping the inflorescence. Spikelets about 7 mm. long, lanceolate, 1-flowered, the bracts 2-ranked. Bracts about 6, the lower aristate, the upper acute. (Fig. 2e). Perianth bristles none. Stamens 3. Style long and hispid, with 3 branches. Fruit apparently rather broad but no ripe fruits seen.

*Hab.* Cape Province : Cape Division ; From Smitswinkel Bay southwards, *Levyns* 6580. (*Type*, in the Bolus Herbarium).

*Flowering season* : April to June.

This is a much stouter plant than any of the other segregates of *T. cuspidata.* Its flowering season, general habit and ligule separate it from *T. paludosa.*

**Tetraria variabilis,** Levyns sp. nov.

*T. cuspidata* (Rottb.) C.B.Cl. affinis sed brevior, spiculis longioribus, angustioribus, bisexualibus vel masculis, bracteis infimis aristatis, nucibus ellipsoideis, angustatis, paulum compressis, rostris parum tuberculatis differt.

A tufted perennial, from 20 to 40 cm. high, with all the spikelets bisexual or with some bisexual and some male, or with all male. Leaves all basal, stiff, wiry, about half the length of the flowering stems : the sheath firm, mahogany red : the lamina slightly flattened at the base, soon becoming terete : the ligule similar to the sheath in texture, the lobes obtuse. (Fig. 1f ). Aerial stems with many spikelets in a contracted panicle. Bracts similar to the leaves, the lowest equalling or overtopping the inflorescence. Spikelets about 7 ·5 mm. long, 1-flowered, very narrow, dull brown, the bracts 2-ranked. Bracts about 7, the lower aristate, the aristae somewhat weak and scarious, the uppermost acute or nearly so.

(Fig. 2f). Perianth bristles none. Stamens 3, sometimes fewer in the male flowers. Style a little longer than the ovary, style branches 3. Fruit narrowly ellipsoidal, dorsally compressed, two ribs well developed, the third rather faint, the beak slightly tuberculate, not bristly. (Fig. 3g).

*Hab.* Cape Province: Cape Division; Sandy places from Smitswinkel Bay southwards, *Levyns* 6054. (*Type*, in the Bolus Herbarium). The type specimen has both male and bisexual spikelets on the one plant.

*Flowering season*: April to June.

**Tetraria autumnalis,** Levyns sp. nov.

*T. cuspidata* (Rottb.) C.B.Cl. affinis sed spiculis angustioribus, stylis scabris, nucibus gracilibus, breviter stipitatis differt.

A tufted perennial about 40 cm. high. Leaves all basal, stiff, wiry, about half as long as the flowering stems: the sheath firm, red at the base, paler above: the lamina channelled at the base, soon becoming terete: the ligule short. (Fig. 1g). Aerial stems wiry bearing several spikelets in a contracted panicle. Bracts leaf-like, the lower exceeding the inflorescence. Spikelets about 6·5 mm. long, 1-flowered, narrow, dull brown, the bracts 2-ranked. Bracts about 6, the lower acuminate, the upper acute. (Fig. 2g). Perianth bristles none. Stamens 3. Style scabrous, a little longer than the ovary, style branches 3. Fruit narrowly ellipsoidal, trigonous, shortly stalked, the beak scabrous. (Fig. 3h).

*Hab.* Cape Province: Cape Division; Near Sirkel's Vlei, in sandy hollows which are damp during the winter months, *Levyns* 6232. (*Type*, in the Bolus Herbarium).

*Flowering season*: April to June.

**Tetraria exilis,** Levyns sp. nov.

*T. cuspidatus* (Rottb.) C.B.Cl. affinis sed minor, foliis capillaceis, latero-complanatis, stylis longioribus, nucibus angustate ellipsoideis, rostris hispidulis differt.

A tufted perennial from 20 to 30 cm. high. Leaves all basal, very slender, one half to one third the length of the flowering stems: the sheath firm, dark red: the lamina slightly channelled at the base, soon becoming laterally compressed and oval in section: the ligule short and obtusely lobed. (Fig. 1h). Aerial stems slender, wiry, terete or slightly flattened, with several spikelets in a contracted panicle. Bracts similar to the leaves, the lower usually overtopping the inflorescence. Spikelets about 4 mm. long, 1-flowered, brown, the bracts 2-ranked. Bracts about 6, acuminate. (Fig. 2h). Perianth bristles none. Stamens 3. Style longer than the ovary, style branches 3. Fruit narrowly ellipsoidal, trigonous, the beak shortly hispid. (Fig. 3j).

*Hab.* Cape Province : Cape Division ; Widely scattered among bushes on the flats and mountains but never very abundant, *Levyns* 7566. (*Type*, in the Bolus Herbarium).

*Flowering season* : April to June.

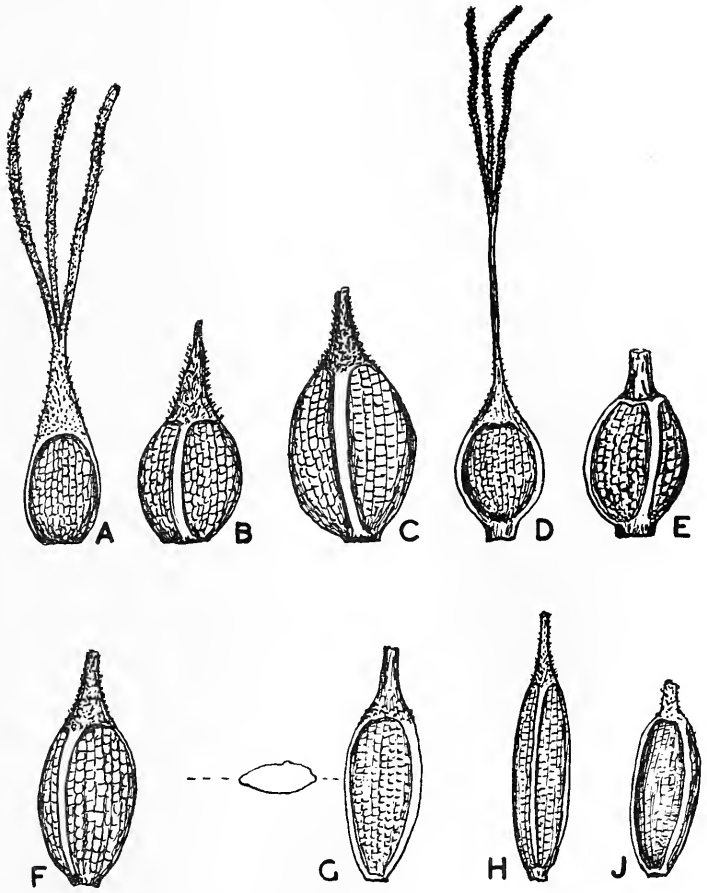



FIG. 3. (a) Gynoeceum of *T. cuspidata* ; (b) Fruit of *T. cuspidata* ; (c) Fruit of *T. compacta* ; (d) gynoeceum of *T. graminifolia* : (e) fruit of *T. graminifolia* ; (f) fruit of *T. paludosa* ; (g) fruit of *T. variabilis* ; (h) fruit of *T. autumnalis* ; (j) fruit of *T. exilis*. All × 10.

**Tetraria brachyphylla,** Levyns sp. nov.

*T. compar* (L.) Lestib. affinis sed foliis paucis, vaginis rigidis, inflorescentiis exilibus, nucibus rostris turbinatis fere levibus differt.

A densely tufted perennial, about 60 cm. high. Leaves few, all basal, the lamina usually less than 10 cm. rarely as much as 20 cm. long : the sheaths tightly clasping the stems, smooth, shining, brownish red : the lamina flat, very slender, the margin minutely toothed : the ligule scarious, 2-lobed. (Figs. 4b, c). Aerial stems terete, deep green, firm and slender, terminated by an inflorescence of 3—6 spikelets. Bracts leaf-like, overtopping the spikelets. Spikelets about 10 mm. long, reddish brown, usually in pairs, the one sessile the other shortly stalked, the bracts more or less 2-ranked. (Fig. 4d). Sterile bracts at the base of each spikelet 4—5, the lower with a conspicuous leaf-like tip, the upper mucronate. Fertile bracts obtuse the lower flower with an abortive gynoeceum, the upper bisexual. Perianth bristles none. Stamens 6, rarely 8. Style branches 3. Fruit smooth below, faintly trigonous, crowned above by an almost smooth, conical cap with faint longitudinal furrows, the cap continuous with the lower part of the fruit. (Fig. 4e).

*Hab.* Cape Province : Cape Division ; The eastern slopes of Kapitein's Peak, Hout Bay, about 800 ft., *Levyns* 8093. (*Type*, in the Bolus Herbarium) ; *Pillans* 4777, collected between Slangkop and Witsands is this species. The latter was cited by Kükenthal as *Tetraria sylvatica* C.B.Cl. var. *pseudocuspidata* Kük.

This species is closely related to *T. compar* (Figs. 4a, f ) from which it differs in its much reduced leaves with firm, smooth brownish red sheaths, in its inconspicuous inflorescence and in its distinctive fruit. The fruits of the two species (Figs. 4e and f) were drawn from living material at the same stage of development. The tubercles on the upper part of the fruit of *T. compar* become less conspicuous and eventually disappear in old dried material, but the surface remains rough. In *T. brachyphylla* the sterile cap is continuous with the lower part of the fruit. In *T. compar* this is not so and the sterile apex bulges over the lower part thus separating sharply the two parts of the fruit from one another.

*Flowering season* : During the winter months, fruiting from October to January.

**Tetraria pygmaea,** Levyns sp. nov.

*T. microstachys* (Vahl.) Pfeiffer (*T. circinalis* C.B.Cl.) affinis sed spiculis minoribus, bracteis obtusis, eciliatis, setis hypogynis 3, minutis, pilosis, nucibus obovoideis, tomentosis praesertim supra, gynophoriis brevibus, crassis differt.

A tufted perennial, 15 cm. high or less. (Fig. 5a). Basal leaves firm

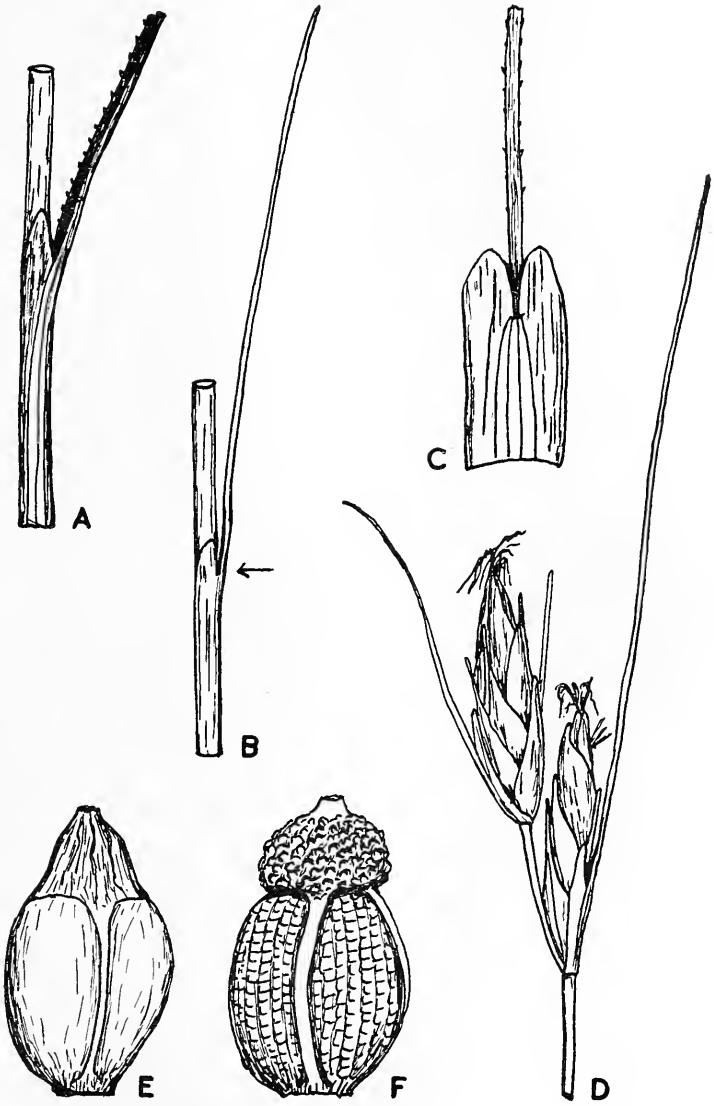



FIG. 4. (a) Top of the leaf sheath, base of the lamina and ligule of *T. compar* × 2. (b) The same in *T. brachyphylla* × 2. (c) The same part of the leaf split open and opened out in *T. brachyphylla*. Viewed from within × 2. (d) The two uppermost spikelets in the inflorescence of *T. brachyphylla*. × 4. (e) Fruit of *T. brachyphylla* × 10. (f ) Fruit of *T. compar* × 10.

in texture, shorter or longer than the aerial stems : the sheaths pale brown, entire at first, at length somewhat fibrous : the lamina flat and involute below, narrowing and becoming semi-circular in transverse

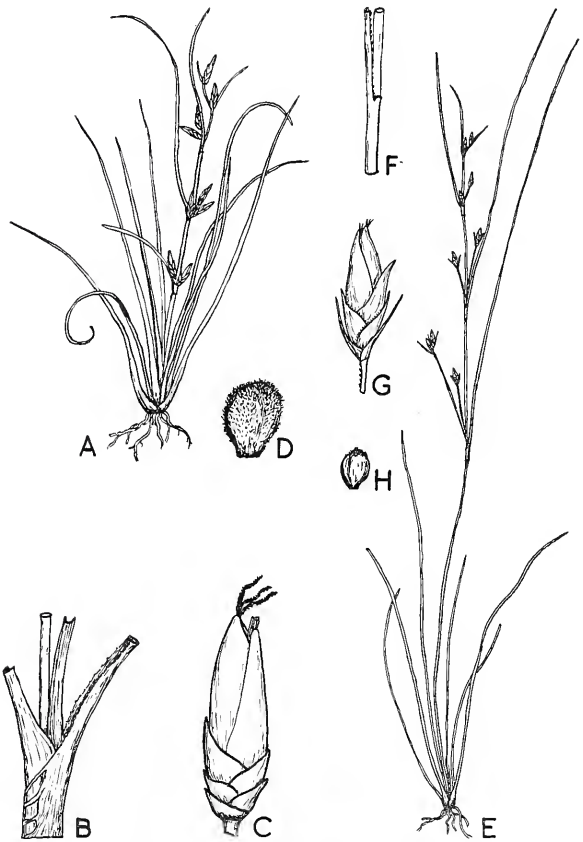



Fig. 5. *T. pygmaea.* (a) whole plant, one quarter natural size. (b) leaf at the junction of sheath and lamina nat. size. (c) Spikelet × 2½. (d) Fruit × 2½. *T. Pillansii.* (e) Whole plant, quarter natural size. (f) Leaf at the junction of sheath and lamina natural size. (g) Spikelet × 2½. (h) Fruit × 2½.

section towards the apex. (Fig. 5b). Cauline leaves similar but with entire sheaths, some overtopping the inflorescence. Aerial stem cylindrical at the base, channelled above, bearing a few yellow-brown spikelets on short axes at the nodes. Spikelets about 6 mm. long. (Fig. 5c). Bracts

2-ranked, obtuse, the 5 or 6 lower sterile, the two uppermost bearing flowers. Lower flower male with an abortive gynoeceum, the upper bisexual. Perianth bristles 3, minute, hairy. Stamens 3. Style much longer than the ovary, with 3 branches. Fruit bluntly obovoid, faintly trigonous, on a short, thick stalk, softly tomentose, the hairs more plentiful towards the apex. (Fig. 5d).

*Hab.* Cape Province: Cape Division; Sandy ground a few miles south of Smitswinkel Bay. *Levyns* 6058. (*Type*, in the Bolus Herbarium).

*Flowering season*: February to April.

**Tetraria Pillansii,** Levyns sp. nov.

*T. Burmannii* (Spreng.) C.B.Cl. affinis sed foliis basaliis brevioribus dimidio inflorescentiis; spiculis paucis, parvis; bractiis circiter 7, infimis minute ciliatis; setis hypogynis nullis; nucibus obovoideis, pubescentibus supra differt.

A tufted perennial, 25 cm. high or less. (Fig. 5e). Basal leaves usually not more than half the length of the aerial stems: the sheaths pale brown, entire at first, eventually breaking up longitudinally into fibres: the lamina very slender, flat at the base; channelled higher up. (Fig. 5f). Cauline leaves similar but with entire sheaths, some overtopping the inflorescence. Aerial stem slender, bearing a few light brown spikelets on capillary lateral axes at each node. Spikelets about 4 mm. long. (Fig. 5g). Bracts about 7, 2-ranked, a few of the lower minutely ciliate, cuspidate or acute. Lower flower male with an abortive gynoeceum, the upper bisexual. Perianth bristles none. Stamens 3. Style with 3 branches. Fruit obovoid, trigonous, very shortly stalked, minutely pubescent on top, glabrous elsewhere. (Fig. 5h).

*Hab.* Cape Province: Cape Division; Gravelly slope among bushes at Kirstenbosch, *Levyns* 8091. (*Type*, in the Bolus Herbarium)

*Flowering season*: January to February.

Acknowledgments.

The writer is indebted to the Curator of the Bolus Herbarium for facilities given for carrying out this work. She wishes to express her gratitude to the Director of Kew for obtaining an extract from the journal in which the description of Tetraria was first published. She is also indebted to Professor Humbert of Paris and Professor Baehni of Geneva for help freely given in trying to trace the type species. Through the great kindness of Professor Baehni some important specimens belonging to the Delessert Herbarium were sent to South Africa. These enabled the writer to come to more definite conclusions than would have been possible otherwise.

# THE IDENTITY OF *ALOE GRACILIS* HAW. (*NON* BAK).

(With Plate XIII.)

By G. W. Reynolds.

The purpose of this short paper is to establish the identity of *Aloe gracilis* Haw., and to reduce *A. laxiflora* N. E. Br. to synonymy.

*A. gracilis* Haw., (not to be confused with *A. gracilis* Bak. a synonym of *A. commixta* Berger), was first described by Haworth in the *Philosophical Magazine and Journal* Vol. 66, p. 279 (1825). Haworth's description reads :

> "*A. gracilis* (soft distant sword-leaved) foliis subdistantibus effuse incurvo-recurvulis anguste longeque lorato-acuminatis glaucis mollibus : marginalibus denticulis remotiusculis minutis. Habitat C.B.S. ubi hanc invenit assiduus Bowie."

The flowers are not described, and no locality of origin is stated. Mr. E. Milne-Redhead of Kew, records (*in litt.*) that there is no material of this species in the Herbarium at Kew, while Dr. Pollunin has examined Aloe material in the Fielding Herbarium and elsewhere at Oxford, where many of Haworth's specimens are preserved, but without result. There is also no specimen of *A. gracilis* Haw. in Bowie's herbarium at the British Museum (Natural History). It seems, therefore, that there is no type material of this species extant. Nevertheless, the species can be identified, without reasonable doubt, since there is a record of the locality where Bowie collected the specimen, and there is also a painting at Kew of a sterile shoot of Bowie's plant.

In the *South African Quarterly Journal* Vol. I, pp. 90-91 (1830), an account is given of three *Aloe spp.* and five *Gasteria spp.*, with descriptions and localities where Bowie collected them. One of the *Aloe spp.* is :

> "*Aloe gracilis* (soft distant sword-leaved Aloe) leaves sheathing the stem, placed at a distance from each other, incurved, narrowing towards the point and bending downwards, sea green, smooth, margins set with smooth remote teeth.—*Aloe gracilis* Haworth in *Phil. Mag.* Oct. 1825. "This species with slender stems about five feet high, was found on the hills near Camtoos River, and also near the stone quarries of Uitenhage, growing among the rigid and more woody productions of a Karoo soil. Habitat given by Mr. Bowie."

This establishes the locality of origin. The hills nearest to the Gamtoos

River lie to the east, *i.e.* the Van Stadens, while the old stone quarries were, it is stated, near Uitenhage. A further and most important clue to the identity of *A. gracilis* Haw, is provided by some paintings preserved at Kew, (attributed to Franz Bauer) of Bowie's material. Mr. E. Milne-Redhead also records (*in litt.*) that among the standard collection of drawings at Kew, of Bowie's material, there are paintings of *A. ciliaris* Haw.—a sterile shoot ; *A. striatula* Haw.,—a flowering shoot ; and *A. tenuior* Haw.—a flowering shoot. In a supplementary collection on larger sheets there is a painting of a sterile branch from Bowie's plant of *A. gracilis* Haw. Due to the kindness of Sir Edward Salisbury, Director of the Royal Botanic Gardens, Kew, in furnishing me with a photograph of the painting of Bowie's material, I am fortunately able to reproduce it here (Plate XIII, Fig. 1).

Sir Edward also kindly supplied me with photographs of the paintings of Bowie's material of *A. striatula* Haw., *A. ciliaris* Haw., and *A. tenuior* Haw., and on collation, there is no doubt whatever that *A. gracilis* Haw., is very distinct, and cannot be confused with *A. ciliaris*, *A. striatula*, or any other closely allied species.

N. E. Brown in his original description of *A. laxiflora* in *Gard. Chron.* I, p. 130, March 3, (1906) gives no locality of origin ; he merely states that :

> "It was sent by Mr. T. G. Griffiths of Port Elizabeth, Cape Colony, in 1897 to Kew Gardens, where it flowered in December 1902."

In their wild state at Witteklip Gorge (Van Stadens), and near Groendal, plants flower in May—June. Witteklip (Van Stadens) is about twenty miles west of Port Elizabeth, while Groendal Dam lies about fifteen miles to the north, at the eastern end of the Winterhoek Mountains, and about eight miles north-west of Uitenhage.

From Bowie's locality of origin, from the painting of Bowie's original material, and from the knowledge of the species found to-day at Witteklip Gorge and Groendal, there is no reasonable doubt that *A. gracilis* Haw. and *A. laxiflora* N. E. Br. are clearly conspecific. It therefore follows that *A. gracilis* Haw. must be upheld, and *A. laxiflora* reduced to synonymy.

The following is the synonymy, with a description based on plants from Witteklip and Groendal :

> *A. gracilis* Haw. (*non* Bak.) in *Phil. Mag.* Vol. 66, p. 279, (1825) ; R. & S. *Syst. Veg.* p. 706 (1829) ; *S.A. Quart. Journ.*, Vol. I, pp. 90-91, (1830) ; Kunth *Enum.* p. 531 (1843) ; *non* Bak. in *Journ. Linn Soc.* p. 170 (1881).—*A. laxiflora* N. E. Br. in *Gard. Chron* I. p. 130 (1906) ; Berger in Engler *Pflrch.* Aloin. p. 255 (1908) ;

*Fl. Pl. S.A.*, Vol. VIII, Plate 303 (1928).

*Description* : A shrubby plant, branched at ground level, with stems erect, about 2cm. diam., up to 2met. long, the terminal 50cm. laxly foliate, with leaves basally amplexicaul, the internodes (sheaths) faintly pale green striate, 10—15mm. distant. *Leaves* : dull green, without spots, not auriculate, not ciliate around the sheathing part, narrowly lanceolate, horizontally spreading, up to 25cm. long, 25mm. broad low down, the upper two thirds gradually acuminate ; upper surface flat low down, slightly canaliculate upwards ; lower surface slightly convex ; margins with a slightly cartilaginous edge armed with firm white teeth up to 1mm. long 2—5mm. distant, more crowded low down, becoming obsolescent near apex. *Inflorescence* simple or 1—2 branched, 20—30cm. high including the raceme. *Peduncle* laterally compressed low down with a few sterile bracts. *Racemes* cylindrical, slightly conical, about 10cm. long, sub-laxly 20—30 flowered, the flowers at length pendulous. *Bracts* narrowly deltoid-acuminate, 5mm. long, 2—3mm. broad at base. *Pedicels* 8mm. long. *Perianth* bright red to scarlet, yellowish at mouth, 4—4·5cm. long, cylindric slightly trigonous, slightly decurved. *Outer segments* connate into a tube for about 30mm., the apical 10—12mm. free, with three greenish nerves at apex, apices subacute, straight to slightly spreading. *Inner segments* free, not cohering dorsally to the outer, broader than the outer, with thin white edges and three congested orange nerves forming a keel, apices brownish and more obtuse than the outer. *Filaments* yellow, filiform-flattened, the three inner narrower and lengthening in advance of the three outer. *Anthers* included, or exserted 1—2mm. *Stigma* included, sometimes exserted 1—2mm. after pollination. *Ovary* 5mm. long, 2.5mm. diam. at middle, tapering a little into the style.

*A. gracilis* Haw. is nearest allied to *A. striatula* Haw. in general habit of growth, but is separated by its different racemes and flowers. Its flowers resemble those of *A. ciliaris* Haw., but the latter is very distinct with its leaves basally auriculate and ciliate.

I am indebted to Sir Edward Salisbury, Director of the Royal Botanic Gardens, Kew, for photographs of paintings of *A. gracilis* and some other species collected by Bowie and described by Haworth ; to Mr. E. Milne-Redhead of Kew for information and data concerning Bowie's specimens ; to Mr. F. R. Long for sending several plants to me from Van Stadens, with notes and data, and to Mr. H. Basil Christian of Arcturus, Southern Rhodesia for notes and plants sent from near Groendal Dam, Uitenhage district. Photographs of these plants, taken when they flowered in my gardens in Johannesburg, are reproduced herein (Plate XIII, figs. 2—4). Unfortunately this distinctive and charming species will not withstand severe frosts.

Fig. 1. Fig. 2. Fig. 3. Fig. 4.

PLATE XIII.

*Aloe gracilis* Haw.

Fig. 1. An unpublished painting by Franz Bauer, in the Collection of Drawings in the Kew Herbarium, of the original plant sent by Bowie to Kew.
—*From a photograph kindly supplied by Sir Edward Salisbury, Director of the Royal Botanic Gardens, Kew.*

Fig. 2: A plant from Witteklip Gorge, Van Stadens, fl. 31 May, 1937 in Johannesburg.

Fig. 3: A plant from Groendal near Uitenhage, fl. 25 June, 1937, in Johannesburg.

Fig. 4: Flowers 1/1 from bud to post-pollination stage.
—*Photos; G. W. Reynolds.*

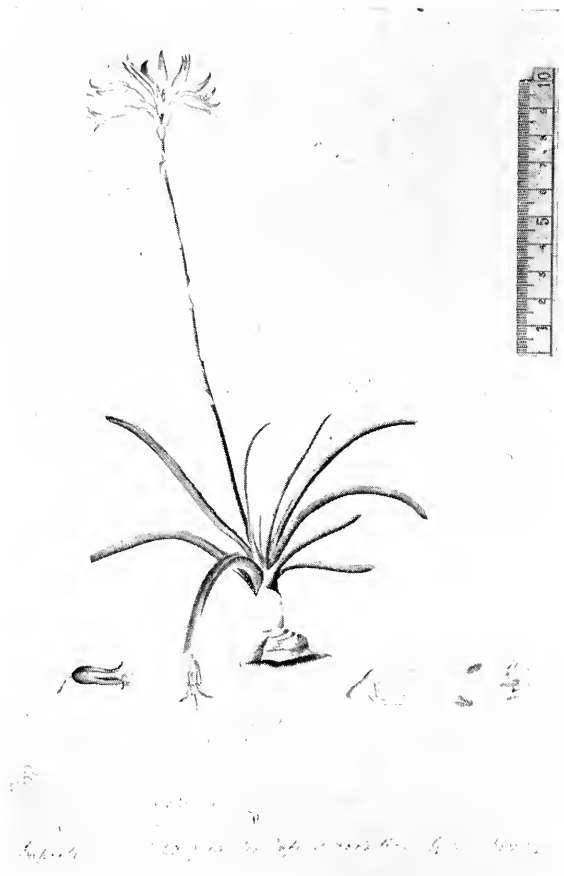


FIG. 1.

*Aloe myriacantha* (Haw.) Roem. & Schult.

An unpublished painting at Kew, of the material sent to Kew by Bowie. The inscription reads "Imported in 1823 from the Cape of Good Hope by Mr. Bowie."

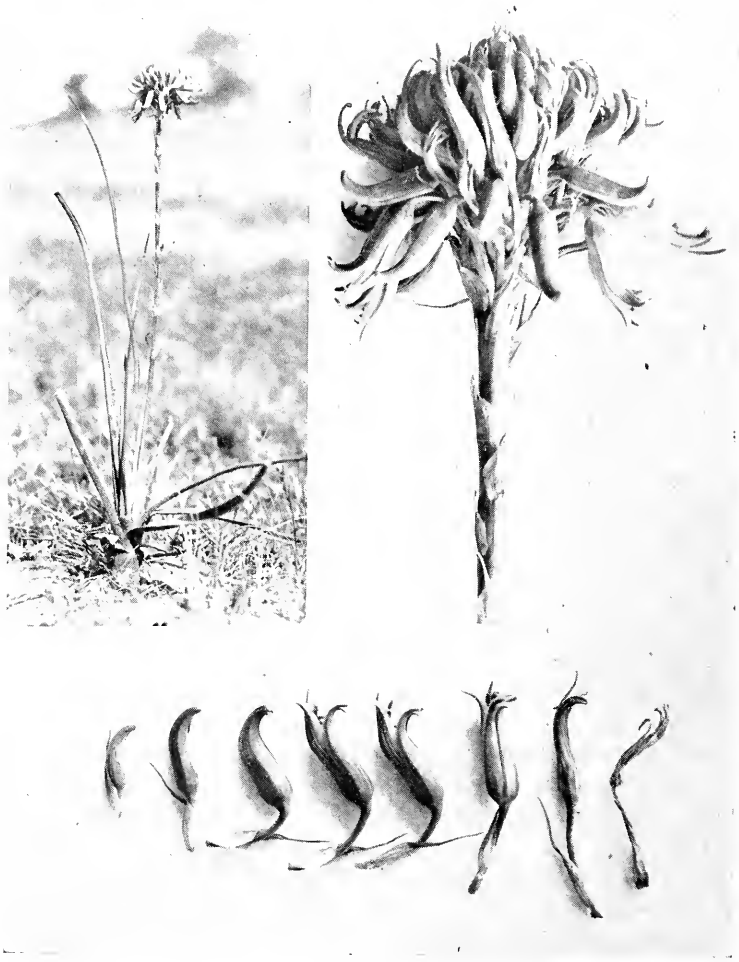


FIG. 2.

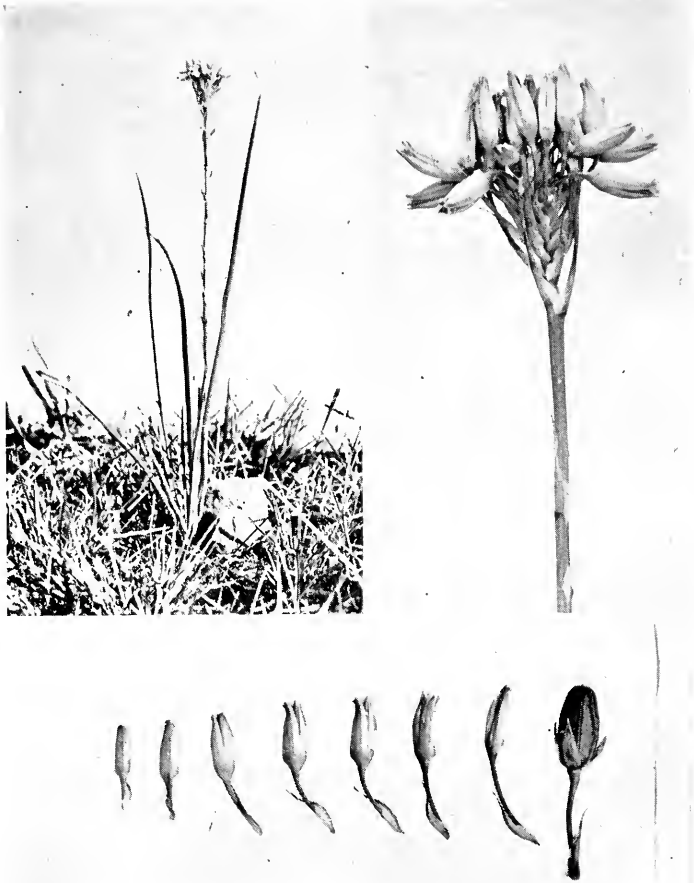
*A. myriacantha* (Haw.) Roem. & Schult.

Plant in natural habitat at Coldspring, near Grahamstown, Albany Div. Height 30cm. Fl. 3 March, 1935. Plant approx × 1/4. Raceme and flowers natural size.

*From a photograph kindly supplied by Sir Edward Salisbury, Director of the Royal Botanic Gardens, Kew.*

PLATE XIV.

*Photos: G. W. Reynolds*



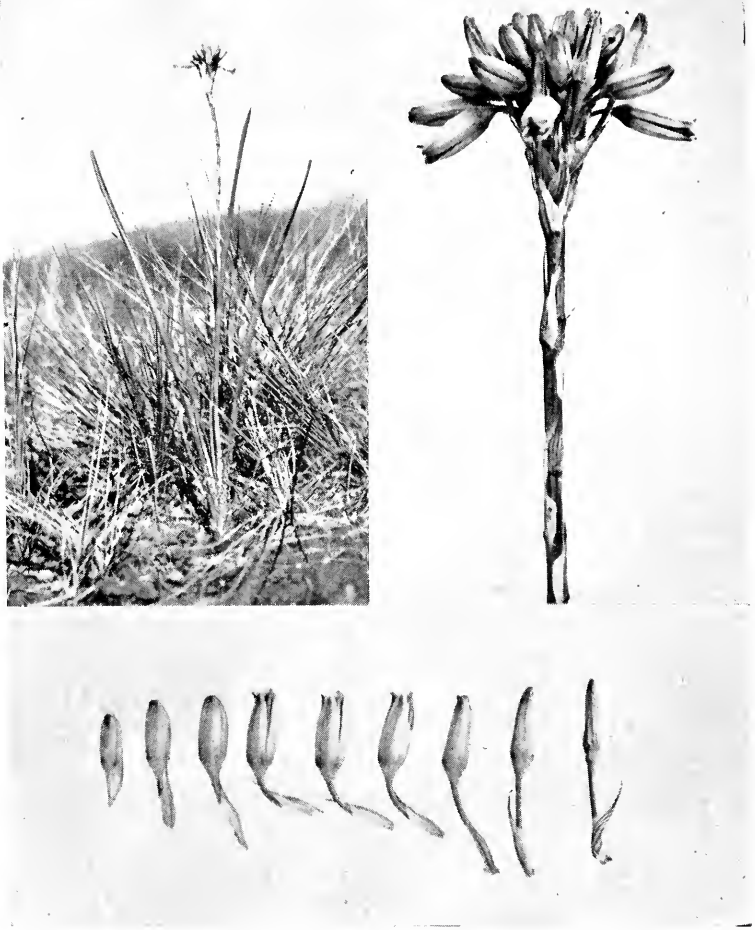


Plate XV.

Fig. 1.

*A. minima* Bak.

Plant near Cato Ridge, Natal. Height 35cm. Fl 20 Feb. 1940. (Leaves 8, rosulate). Plant approx. × 2/5. Raceme and flowers natural size.

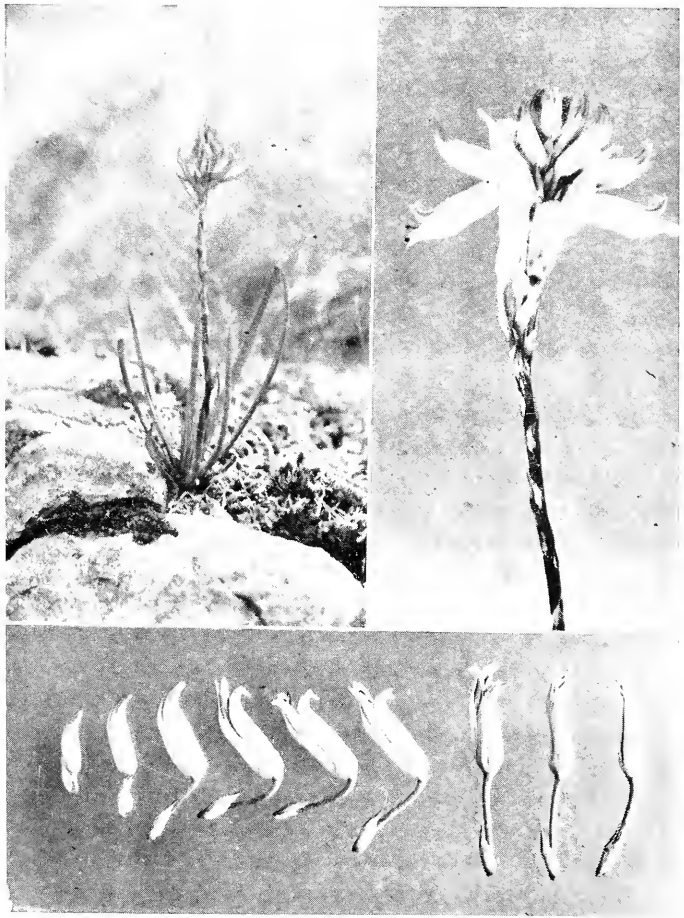
*Photos ; G. W. Reynolds.*

Fig. 2.

*A. minima* Bak. var. *blyderivierensis* (Groen) Reynolds.

Plant in natural habitat on mountain slopes near the Blyde River, north of Pilgrims Rest, Eastern Transvaal. Height 35cm. Fl. 15 Feb., 1940. (Leaves 5, distichous). Plant approx. × 1/4. Raceme and flowers natural size.

*Photos ; G. W. Reynolds.*



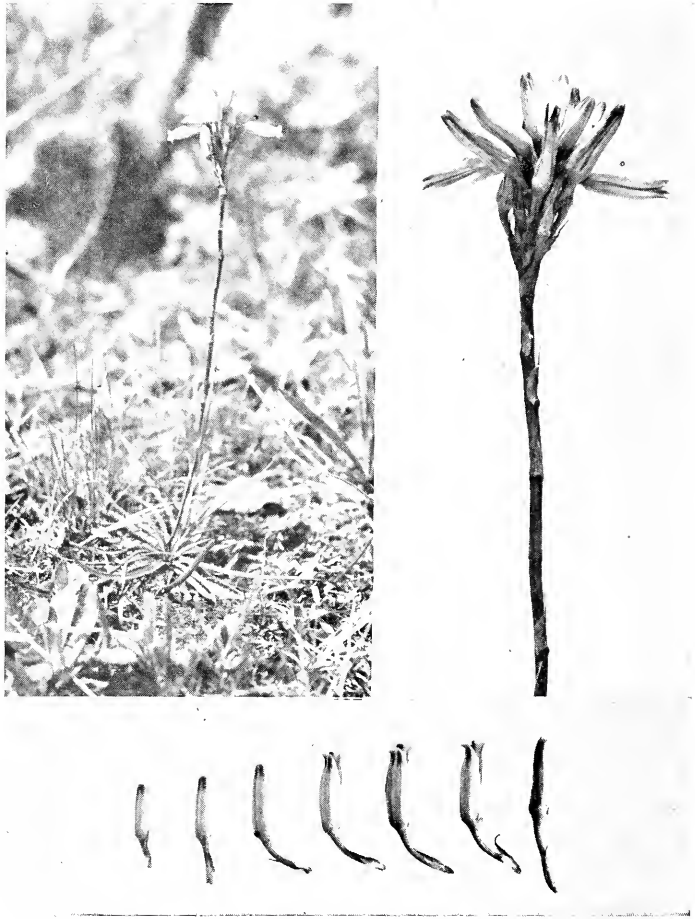


PLATE XVI.

FIG. 1.

*A. albida* (Stapf) Reynolds.

Plant (in bud) on southern slopes of the Angle Station Mountain, 15 miles south of Barberton, Eastern Transvaal. Height 18cm. Fl. 30 March, 1940. Plant, approx. × 1/3. Raceme and flowers natural size.

*Photos ; G. W. Reynolds.*

FIG. 2.

*A. Saundersiae* (Reynl.) Reynolds.

Plant in natural habitat, 1 mile north of Nkandhla Forest, Zululand. Fl. 8 March, 1939. Height 17cm. Plant approx. × 2/5. Raceme and flowers natural size.

*Photos ; G. W. Reynolds.*

# GENUS LEPTALOE STAPF.

## RESTORATION TO ALOE LINN.

By G. W. Reynolds.

(With Plates XIV—XVI).

In *Bot. Mag. t.* 9300 (1933) Stapf erected a new genus LEPTALOE which he founded on *L. albida* from the Saddleback Mountains near Barberton. This species had previously been regarded by Baker as belonging to *Aloe Kraussii* Bak. var. *minor* Bak., and by Berger to *A. myriacantha* (Haw.) Roem. & Schult. var *minor* Berger.

Stapf was correct in according distinct specific rank to the Saddleback plant, and he also correctly included, as its nearest allies, *L. myriacantha*, *L. minima* and *L. parviflora* from South Africa, and *L. Johnstonii*, *L. graminifolia* and *L. caricina* from Tropical Africa.

Berger in *Pflrch.*, Liliac.-Aloin. p. 164 (1908) more correctly regarded them as belonging to the genus Aloe, and he included them in his Section II *Leptoaloe*, a section comprising a heterogeneous mixture which included such divergent morphological forms as *A. minima*, *A. chortolirioides*, *A. Marshallii*, *A. Cooperi*, and *A. Boylei*.

In recent years two further species have been described, *L. Saundersiae* from Zululand, and *L. blyderivierensis* from the Eastern Transvaal. The position now clearly needs reviewing.

The consensus of South African botanical opinion is that *L. albida* and *L. myriacantha* are *not* generically distinct from Aloe, but that they and their nearest allies constitute a natural and distinctive Section of that genus.

The purpose of this paper is, therefore, to restore *L. myriacantha* and allies to genus Aloe, to erect a new Section for the group, and to provide a Key to the species. It is not necessary to describe the species again.

The following is a list of the species involved, together with synonymy and notes :—

(1) **Aloe myriacantha** (Haw.) Roem. & Schult. in *Syst. Veg.* VII 704 (1829) ; Kunth. *Enum. pl.* IV 516 (1843) ; Baker in *Journ Linn. Soc.* XVIII 156 (1880), in Th. Dyer *Fl. Cap.* VI 306 (1896) Schonland in *Rec. Alb. Mus.* I 35 (1903) ; Berger in Engler *Pflrch*

Liliac.-Aloin. 166 (1908).—*Bowiea myriacantha* Haw. in *Phil. Mag.* 122 (1827).—*Leptaloe myriacantha* (Haw.) Stapf. in *Bot. Mag. t.* 9300 (1933).

This species was first described by Haworth as *Bowiea myriacantha* from material sent to Kew by Bowie in 1823. I am indebted to Sir Edward Salisbury, Director of the Royal Botanic Gardens, Kew, for a photograph (herein reproduced) of an unpublished painting at Kew of Bowie's plant. (Plate XIV, fig. 1.).

*A. myriacantha* has been repeatedly collected along the Zuurberg near Grahamstown, also at Gonubie and Fort Grey in the East London district, while Rev. F. J. Gerstner has collected a form near Richards Bay, Zululand. Flowers March—April. (Plate XIV, fig. 2.).

(2) **A. Johnstonii** Bak. in *Trans. Linn. Soc.* ser. 2, Bot. ii 351 *t.* 63 (1886), in Th. Dyer *Fl. Trop. Af.* VII 456 (1898); Berger in Engler *Pflrch.* Liliac.-Aloin. 167 (1908).—*Leptaloe Johnstonii* (Bak.) Stapf in *Bot. Mag. t.* 9300 (1933); Christian in *Fl. Pl. S.A.* vol. XX Plate 799 (1940).

I have not seen living plants, but from Mr. Christian's description, this species is one of the largest in this Section. Leaves are rosulate, 30—50cm. long, 4—6mm. broad, inflorescence as tall as the leaves, up to 50cm. high, racemes 6cm. long and broad. Berger states leaves are distichous, but Mr. Christian records "All the material I have seen both living and dried, from different localities, has the leaves rosulate." Mr. Christian (*in. litt.*) states that leaves are not keeled, and flowers are always pale pink. Flowers in March; occurs in Tanganyika, Kenya and Uganda.

(3) **A. minima** Bak. in Hook. *Icon. pl.* XXV. *t.* 2423 (1895), in *Kew Bull.* 153 (1905), in Th. Dyer *Fl. Cap.* VI 305 (1896); Berger in Engler *Pflrch.* Liliac.-Aloin. 166 (1908); *non* Medley Wood in *Natal Plants* IV Plate 338 (1906).—*Leptaloe minima* (Bak.) Stapf in *Bot. Mag. t.* 9300 (1933).

Described from a plant collected on the farm "South Downs," about 12 miles west of Estcourt, Weenen County, Natal, *A. minima* has a wide distribution in many parts of Natal and Zululand, and extends into the hilly parts of Swaziland and the South-eastern Transvaal. (Plate XV, fig. 1.).

*L. blyderivierensis* Groenewald was described from the Drakensberg, near Vaalhoek, along the Blyde River (after which it is named) about 30 miles north of Pilgrims Rest, Eastern Transvaal. It is

also found near Pilgrims Rest, and 6 miles north of Graskop, near the Lisbon Falls. I have compared living plants from these localities, with typical *A. minima* in Natal, and found that there is no distinct specific difference between them in inflorescence, racemes, shape and colour of flowers. Both have leaves obtusely keeled, both have no marginal teeth from the middle upwards. In typical *A. minima* leaves are 6—10, rosulate, 4—6mm. broad, while in the Blyde River plants leaves are usually 4—6, distichous or subdistichous, rarely rosulate, 5—6mm. broad, the leaves more fleshy. Racemes and flowers are slightly larger. These plants cannot be upheld as specifically distinct, and are therefore reduced to varietal rank.

(3*a*) **A. minima** Bak. var. **blyderivierensis** (Groen.) Reynolds. *Comb. nov.—Leptaloe blyderivierensis* Groenewald in *Fl. Pl. S.A.* vol. XVII, Plate 651 (1938).

Differs from the typical in having leaves 4—6, slightly broader and more fleshy, distichous or sub-distichous, rarely rosulate, racemes and flowers slightly larger, otherwise as in the typical form. Flowers February. (Plate XV, fig. 2.).

*Note* : Hook. *Icones t.* 2423 (1895) shows the flowers of *A. minima* with straight segment apices and open mouth. In the wild state, the perianth is constricted near mouth, with segment apices slightly spreading, the mouth slightly upturned, but not bi-labiate. Flowers in February.

(4) **A. parviflora** Bak. in *Schinz Beitr. zur Kenntn. der Afr. Fl* XIII in *Bull. Herb. Boiss.* 2. ser. n8, 785 (1901) ; Berger in Engler *Pflrch.* Liliac.-Aloin. 165 (1908) ; Engler et Drude *Veget. Erde.* IX II p. 320 *t.* 218 (1908).—*Leptaloe parviflora* (Bak.) Stapf in *Bot. Mag. t.* 9300 (1933).

Engler and Drude's figure is identical with Berger's, and depicts a plant with flat lorate-linear leaves distinctly muricate 6—8mm. wide, with flowers 8mm, pale rose. Type locality is near Pinetown, Natal. Date not stated, but probably flowers in February. (Text-fig. 1.).

I have searched near Pinetown in vain for this species, and it does not appear to have been collected again. There also appears to be no material of this species in South African Herbaria. According to Berger, *A. parviflora* is well separated from its allies with its muricate leaves, and 8mm. pale rose flowers. Leaves appear to be broader above, gradually narrowing low down.

(5) **A. albida** (Stapf) Reynolds. *Comb. nov.—Aloe Kraussii*

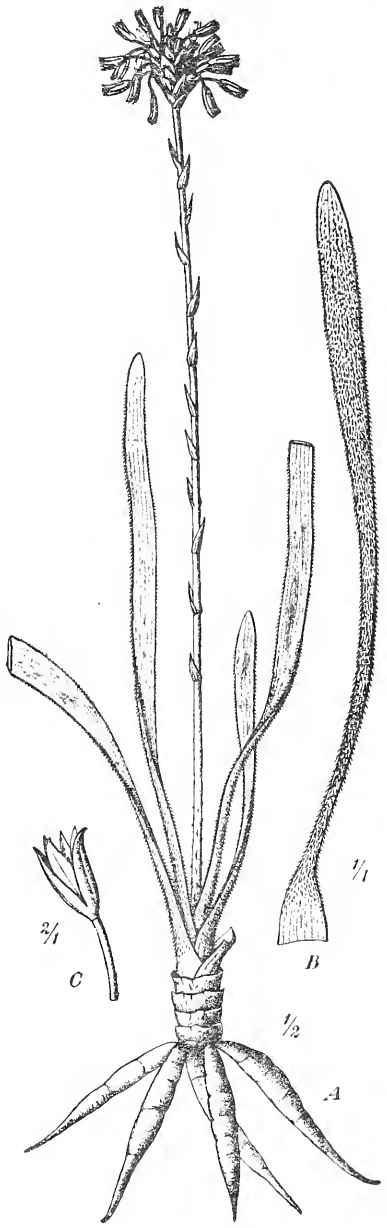



Fig. 55. *Aloe parviflora* Bak. *A* Habitus. *B* Folium. *C* Perigonium. (Icon. orig.)

Text-fig. 1.

*A. parviflora* Bak.

Reproduction of Berger's figure in Engler *Pflrch.* Liliac.-Aloin., p. 165 (1908).

Bak. var. *minor* Bak. in Th. Dyer *Fl. Cap.* VI 306 (1896);—*A. myriacantha* Schonl. in *Rec. Alb. Mus.* I, 34 (1903) *non* Roem & Schult.; *A. myriacantha* (Haw.) Roem & Schult. var. *minor* Berger in Engler *Pflrch.* Liliac.-Aloin. 167 (1908);—*Leptaloe albida* Stapf in *Bot. Mag. t.* 9300 (1933).

This charming and distinctive little species occurs in several localities in the mountains south of Barberton, Eastern Transvaal. It has been collected along the top of the Saddleback, and on top of Emlembe Mountain near the Swaziland Border, while I have personally observed it on eastern, southern and western slopes of the Cableway Angle Station mountain, all at altitudes of 5,000 feet and more, in the mist belt. (Plate XVI, fig. 1.).

Mr. J. N. Thorncroft has found plants near Elephants Head (Saddleback) growing in grey-green moss, increasing and forming tufted groups, but the form most typical of the species is solitary plants, with rigid leaves sub-erect to erect.

(6) **A. Saundersiae** (Reynl.) Reynolds *Comb. nov.*—*Leptaloe Saundersiae* Reynl. in *Journ. S.A. Bot.* vol. II, p. 124 Plate XVIII (July 1936).—*Aloe minima* Medley Wood in *Natal Plants* IV. Plate 338. (1906) *non* Bak.

This little Aloe, the smallest known, occurs in large numbers along the top of the mountain to the north of Nkandhla Forest, and about 9 miles South of Nkandhla village, Zululand. It has also been collected by Mr. E. Schelpe Jun. 40 miles south-west of Lowlands, Natal.

At the Nkandhla locality, mostly solitary plants are found among tufts of grass, leaves being 3—5cm. long spreading almost on the ground, with inflorescence 15cm. tall, flowers 10—12mm., pinkish-vinaceous, the mouth trigonous, not bi-labiate. In sheltered protected positions, and especially if cultivated in moist shady positions, leaves reach 20cm. in length, with inflorescence 25cm. tall. It differs from its nearest ally *A. albida* in having narrower spreading leaves, slenderer peduncle, and shorter flowers with mouth regular. Flowers in March. (Plate XVI, fig. 2.).

(7) **A. graminifolia** Berger in Engler *Bot. Jahrb.* XXXVIII 84 (1905), in Engler *Pflrch.* Liliac.-Aloin, 166 (1908).—*Leptaloe graminifolia* (Berger) Stapf in *Bot. Mag. t.* 9300 (1933).

This species is known to me only by description. Berger described it from between Kilimanjaro and Meru, with leaves only 3mm. broad, inflorescence 40cm., racemes ovate-cylindric 6—8cm.

long and about 5cm. broad, pedicels 15—18mm., perianth 15—17mm. long, greenish; the mouth it seems is bi-labiate. Mr. Christian (*in. litt.*) records leaves 10—20cm. long. This species seems to be nearest allied to *A. Saundersiae* in leaves, and to *A. myriacantha* in flowers.

(8) **A. caricina** Berger in Engler *Bot. Jahrb.* XXXVIII 85 (1905), in Engler *Pflrch.* Liliac.-Aloin. 166 (1908).—*Leptaloe caricina* (Berger) Stapf in *Bot. Mag. t.* 9300 (1933).

Berger states that this species is similar to *A. graminifolia* but smaller, and differs with shorter narrower leaves and slenderer peduncle. He regards it as a *species non satis cognita* introduced from the same locality as *A. graminifolia.*

The above species constitute a natural and distinctive group, and require a New Section. Since these species are mostly grassland plants with grasslike leaves, I propose a New Section GRAMINIALOE for them.

The New Section GRAMINIALOE falls after Berger's Sect. I. ALOINELLA, and before his Sect. II LEPTOALOE, which now becomes Sect. III.

Sect. II **GRAMINIALOE** Reynolds. Sect. nov.

*Diagnosis*: Small acaulescent plants with fusiform roots. Leaves 4—10, narrowly linear, mostly rosulate-multifarious, sometimes distichous. Inflorescence simple. Peduncle slender, sterile bracteate in upper half. Racemes capitate or conico-capitate. Flowers 10—20mm. pedicillate. Perianth 10—20mm. long, basally stipitate, mouth trigonous, or distinctly bi-labiate, usually upturned. Segments free to base. Genitals included or exceedingly shortly exserted.

Species 8, of which 5 from South Africa.

Type Species: *A. myriacantha* (Haw.) R. & S.

Plants in this Section fall naturally into two main groups, those with flowers bi-labiate, and those with regular trigonous slightly upturned mouth. Through usage, the term bi-labiate has been retained, although the mouth is not strictly bi-labiate. The lower segment apices are straight to slightly upcurved, and never distinctly decurved as in Haworthia.

The flowers of *A. Saundersiae* do not fit well, but this species obviously belongs here. The majority have leaves rosulate-multifarious.

Compared with wild plants, those cultivated in green-houses, or in rich shady garden soil and well watered, often modify almost out of recognition. To give measurements of such plants would only be confusing.

In the subjoined Key, the measurements given for the South African species are of average sized plants as I have observed them in their natural habitats.

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## KEY TO THE SPECIES.

A.—PERIANTH MOUTH BI-LABIATE (leaves rosulate).

(*a*) Leaves 3mm. broad, 10—20cm. long, Perianth 15—17mm., greenish .. .. .. .. *A. graminifolia.*

(*b*) Leaves 2—4mm. broad, 10—15cm. long, Perianth 18mm., white, greenish tipped .. .. .. *A. albida.*

(*c*) Leaves 4—8mm. broad, 25—30mm. long, Perianth 20mm., dull-pinkish .. .. .. .. .. *A. myriacantha.*

(*d*) Leaves 4—6mm. broad, about 40cm. long, Perianth 20mm., dull-pink .. .. .. .. .. *A. Johnstonii.*

B.—PERIANTH MOUTH REGULAR (not bi-labiate).

(1) *Leaves* 6—10, *rosulate-multifarious.*

(*a*) Leaves 3mm. broad, 4—8cm. long, Perianth 10—12mm., pinkish-vinaceous .. .. *A. Saundersiae.*

(*b*) Leaves 4—6mm. broad, 25—35cm. long, Perianth 10mm. Corinthian-pink.. .. .. .. *A. minima.*

(2) *Leaves distichous.*

(*a*) Leaves 4, 6—8mm. broad, flat, muricate, Perianth 8mm. pale-rose. (The only species with leaves muricate) .. .. .. .. *A. parviflora.*

(*b*) Leaves 4—6—8, 5—6mm. broad, 25—30cm. long, Perianth 12mm., flesh-pink .. .. *A. minima* var. *blyderivierensis.*

# A CYTOLOGICAL AND MORPHOLOGICAL STUDY OF CULTIVATED CYNODON SPECIES.

(With Plate XVII).

By Ruth Hurcombe.

Introduction :

Many problems have arisen in connection with the systematics of the genus Cynodon and there is great necessity that these anomalies be cleared up and the genus thoroughly revised. The confused taxonomy is due to the wide range of variability existing within so-called species and also to the large number of intergrading forms that occur between these species.

The study of this genus was undertaken with the object of disclosing definite characteristics which would enable workers to distinguish between species and varieties of Cynodon and to identify isolated plants.

As the increasing interest in turf problems which results from the growing demand for ornamental lawns, sports fields and aerodromes has emphasized the value of Cynodon species as lawn grasses, it was decided to commence the work with the study of grasses in common use. The five lawn grasses selected are known to gardeners and field workers as " Coarse kweek " (*Cynodon dactylon* Pers.), " Florida " (*Cynodon transvaalensis* Burtt Davy), " Bradley " (*Cynodon Bradleyi* Stent), " Magennis " and " Hall's Selection ". The three first mentioned are recognised species. The writer found " Magennis " to be a hybrid between *Cynodon dactylon* and *Cynodon transvaalensis*. Because this hybrid reproduces vegetatively and so remains true to type, it has been given specific rank and is referred to as *Cynodon Magennisii* sp. nov. " Hall's Selection " was found to be a variety of *Cynodon dactylon* ; it is referred to as *Cynodon dactylon* Pers. *var. densus* var. nov. owing to its compact habit of growth.

Before the commencement of this work the five grasses selected had been growing in the experimental plots at Frankenwald (the Botanical Research Station of the University of the Witwatersrand) for at least three years, and had throughout this period retained their original distinguishing features.

It was decided to base the classification of the Cynodon genus on a study of external morphology, leaf anatomy and chromosomes.

External Morphology :

After a critical and detailed examination of the external morphology of the Cynodon species studied, it was concluded that these species do not differ greatly, and that the only reliable and constant characters are the vernation of the leaves, the presence or absence of rhizomes, the nature of the produced rachilla, the number of primary nerves, and the length of the glumes in relation to that of the spikelet. In addition, the length, width and hairiness of the leaf, the number of spikes, the nature of the ligule, and size, are characters which are useful diagnostically when they are considered not individually but in conjunction with other characters.

*Cynodon Bradleyi* is a distinct species which differs from the other Cynodon species studied in the following respects :

(*a*) no underground rhizomes are present.
(*b*) the leaves are rolled in the bud.
(*c*) the leaves are very hairy on both surfaces, with hairs up to 1 ·5 mm. long. (The hairiness of the leaves appears to be a constant character in this species).
(*d*) the ligule is usually distinctly membranous and up to 1 mm. long.
(*e*) the rachilla when produced is a short bristle less than 1 mm. long, which never bears a reduced floret.

*Cynodon transvaalensis* differs from the other Cynodon species studied in that there are only 3 primary nerves in the leaf blade. In addition, this species is characterised by leaves less than 1 ·5 mm. wide, 1 to 3 (usually 2) spikes, glumes $\frac{1}{4}$ to 1/3 the length of the spikelet, and a produced rachilla which never bears a reduced floret.

*Cynodon dactylon* is distinctive in that the glumes may be almost as long as the spikelet. This grass is more vigorous and has a more robust habit than any of the other forms ; the spikes may be as many as 6 and 1 ·5 to 6 ·5 cm. long, the leaves are 3 to 4 mm. wide and 2 to 16 cm. long, and the flowering culms may grow to a height of 40 cm.

*Cynodon dactylon var. densus* (Hall's Selection) is closely similar to *Cynodon dactylon* in all essential features of external morphology. Since these two grasses differ only in size and habit, it would appear that " Hall's Selection " is merely a prostrate, slow-growing variety of *Cynodon dactylon*.

**Cynodon dactylon** Pers. var. **densus** var. nov.

A *C. dactylone* differt habitu repentiore, densiore caespite et auctu tardiore.

*C. Magennisii* closely resembles both *Cynodon dactylon* and *Cynodon transvaalensis* in external morphology, and appears to be intermediate

between these two species. In general appearance *Cynodon Magennisii* is very similar to *Cynodon transvaalensis*; the two grasses are both fine lawn grasses, with the same growth form, and fairly short narrow leaves sparsely hairy on both surfaces. However, as regards the number of primary nerves in the leaf blade, and the presence of a reduced floret borne on the produced rachilla, *Cynodon Magennisii* is closely related to *Cynodon dactylon*.

**Cynodon Magennisii,** sp. nov.

*C. transvaalensis* × *C. dactylon*; *C. transvaalensem* magnitudine et habitu revocat.

Perennis; repens, dense caespitosa, stolonifera, et rhizomis subterraneis; *culmi* tenues, erecti, 3—6 cm. alti; *folia* ab initio plicata deinde angusta linearia, fusca viridia nec glauca; *vagina* 0·4—1·5 cm. longa; *lamina* 0·5—4·5 cm. longa, basim 2 mm. lata, nervibus praecipuis 5, supra subtusque papillis et ciliis sparsis 0·8 mm. longis; *ligula* 0·2 mm. longa, membranacea vel ad seriem ciliatam reducta; *spicae* 3 vel 4, digitatae, 1·5—2·5 cm. longae; *rachilla* prolongata, tenuis, 1 mm. longa, saepe flosculo reducto; *spicula* sterilis, ovata, 2 mm. longa; *glumae* subaequales et acutae, dimidia spiculae parte longae, uninerves; *lemma* trinervis, nec carinata, apice subacuto, 2 mm. longa; *palea* 2 mm. longa.

Leaf Anatomy:

The anatomical structure of the leaves of the Cynodon species studied was found to be closely similar. The only reliable diagnostic features are the nature of the abaxial epidermis (the presence or absence of tubercle-based hairs and papillae, and the thickness of the outer cell wall), and the number of first order bundles present.

Fisher (1940) uses as diagnostic characters not only the nature of the abaxial epidermis and the number of first order bundles, but also the occurrence of parenchyma in the midrib. According to Stent (1927) the presence of parenchyma between the bundles is an important specific character. The writer considers the occurrence of parenchyma, both in the midrib and between the bundles, to be variable and unreliable diagnostically.

*Cynodon transvaalensis* is characterised by the presence of only three first order bundles, and *Cynodon dactylon* by the unusual nature of the abaxial epidermis. A comparison of the leaf anatomy appears to support the contention that *Cynodon Magennisii* is a hybrid—the result of a cross between *Cynodon dactylon* and *Cynodon transvaalensis*. On the

whole, the internal structure of the leaf of *Cynodon Magennisii* more closely resembles that of *Cynodon transvaalensis*, particularly as regards the nature of the abaxial epidermis; however, the presence of five first order bundles establishes its affinity with *Cynodon dactylon*. The leaf anatomy of *Cynodon dactylon var. densus* was, for all practical purposes, identical with that of *Cynodon dactylon*, although these two grasses are very different in habit and growth form. It is of interest that the leaf structure of *Cynodon Bradleyi* is so similar to that of the other Cynodon species studied, considering that, with respect to the rolling of the leaves in the bud, it is so distinct. The only anatomical feature which separates it from the other species is the excessive hairiness of the leaf.

These anatomical features have been used in conjunction with the external morphological characters, to produce the following key for the classification of the different species:

## Artificial Key to the Species.

| | | |
|---|---|---|
| 1. | Leaves folded in the bud | 2 |
| | Leaves rolled in the bud; leaves densely hairy on both surfaces with hairs 1·5 mm. long; rachilla sometimes produced but never bearing a reduced floret; ligule usually distinctly membranous; underground rhizomes absent | *Cynodon Bradleyi.* |
| 2. | 5 primary nerves in the leaf-blade | 3 |
| | 3 primary nerves in the leaf-blade; 1 to 3 (usually 2) spikes; rachilla always produced but never bearing a reduced floret; glumes ¼ to 1/3 the length of the spikelet; leaves not more than 1·5 mm. wide; a fine lawn grass | *Cynodon transvaalensis.* |
| 3. | Both surfaces of the leaf conspicuously papillate, and sparsely covered with hairs; glumes ½ length of spikelet; leaves less than 2 mm. wide; a fine lawn grass | *Cynodon Magennisii.* |
| | Abaxial surface of the leaf without distinct papillae and usually glabrous; glumes more than ½ the length of the spikelet; leaves not more than 2 mm. wide; coarse grasses | 4 |
| 4. | Spikes 2 to 6, 1·5 to 6·5 cm. long; leaves 2 to 16 cm. long and 3 to 4 mm. wide; flowering culm up to 40 cm. high; hairs on leaf up to 1·5 mm. long; a vigorous grass | *Cynodon dactylon.* |
| | Spikes 2 to 4, 1·5 to 2·5 cm. long; leaves 0·5 to 3 cm. long and 2 to 3 mm. wide; flowering culm up to 10 cm. high; hairs on leaf not more than 0·5 mm. long; a slow-growing prostrate grass | *Cynodon dactylon var. densus.* |

Chromosomes:

*Previous work on Cynodon Chromosomes:*

Avdulow (1931) records a diploid chromosome number of 36 for *Cynodon dactylon* Pers., and maintains that the basic number of the genus is 9.

Hunter (1934), on the other hand, found a somatic chromosome number of 30 in *Cynodon dactylon* Pers., and states that the basic number appears to be 10.

Darlington and Janaki Ammal (1945) consider 9 to be the basic number of the Cynodon genus. They give the following chromosome counts :—

*Cynodon diploidum* n. sp. (Giant Star Grass)—18—Janaki Ammal, unpublished count.
*Cynodon dactylon* (Bermuda Grass) . . . . —36—Avdulow, 1931.
—36—Janaki Ammal, unpublished count.
—30 ?—Hunter, 1934.

The chromosome numbers given are the somatic or diploid numbers. The question mark is added after Hunter's number, as the writers (Darlington and Janaki Ammal) are uncertain of this number or of its attachment to the botanical name given.

Methods :

Root tips were fixed in Navashin's fluid, sectioned transversely at 7 microns, and stained with crystal violet.

Critical observations of chromosomes were made with a Bausch and Lomb 2 mm. (90 × ) apochromatic oil immersion objective and a Zeiss 17 × ocular, giving a total magnification of 3,000 × at table level. The diagrams of the metaphase plates were drawn at this magnification with the aid of a Zeiss camera lucida. Photographs of the same metaphase plates were taken at a magnification of 1,150 × .

Results :

The following chromosome counts were made from metaphase plates in root tip cells :

| | |
|---|---|
| *Cynodon Bradleyi* Stent . . . . . | 18 |
| *Cynodon transvaalensis* Burtt Davy . . | 20 |
| *Cynodon dactylon* Pers. . . . . | 40 |
| *Cynodon dactylon* Pers. *var. densus* var. nov. | 40 |
| *Cynodon Magennisii* sp. nov. . . . . | 30 |

Discussion of Results :

It is obvious from an examination of the somatic chromosomes of the Cynodon species studied that the chromosomes in each complement, because they are small and remarkably uniform, cannot be distinguished morphologically. Any cytological classification must therefore be based entirely on differences in chromosome number.

With the exception of *Cynodon Bradleyi*, the somatic chromosome numbers of the Cynodon species studied form a polyploid series with a basic number of 10, in which *Cynodon transvaalensis* is the diploid form,

*Cynodon Magennisii* the triploid, and *Cynodon dactylon* and *Cynodon dactylon var. densus* both tetraploid forms.

It is difficult to ascertain the cytological relationship of *Cynodon Bradleyi* to the other species. It is possible that this grass may be an aneuploid ; as a result of non-disjunction or unequal distribution of the chromosomes, gametes with one chromosome less than the usual number may arise, and the union of two such n—1 gametes would result in a form with one pair less than the usual somatic complement. According to Sharp (1926) such aneuploid forms differ more from the normal diploid than do polyploid forms. Church (1929) came across several such examples in his study of grass genera. He found it convenient to use the term " dysploids " for these " irregular deviations from the fundamental haploid base in a polyploid series ". He also discovered that many of these " dysploids " had an obvious hybrid origin, and came to the conclusion that hybridity and dysploidy were frequently correlated. The fact that *Cynodon Bradleyi* is completely sterile suggests that this grass may also be of hybrid origin. Such an origin might certainly account for its unusual chromosome number.

Alternatively, it may be suggested that the Cynodon genus has two basic numbers of 9 and 10, and that the genus has therefore developed along two separate lines. On this assumption, it would be difficult to explain why *Cynodon Bradleyi*, the diploid form in the 9-series, is completely sterile. If two groups are present in the genus, one would expect to find very distinct morphological and anatomical differences between *Cynodon Bradleyi* on the one hand, and the other species on the other. Differences do exist ; *Cynodon Bradleyi* is distinct from the other species as regards the leaf vernation and the absence of underground rhizomes. However, these differences would appear too slight to provide the evidence in support of such an assumption.

A careful study of the external morphology and leaf anatomy of *Cynodon Magennisii* suggests that this grass is intermediate between *Cynodon dactylon* and *Cynodon transvaalensis*. In his description of the origin of this grass (Mathews, 1935), Mr. W. B. Magennis definitely considers it to be a hybrid between " Florida " (*Cynodon transvaalensis*) and " Kweek " (*Cynodon dactylon*), and the chromosome number supports his contention. Historical, morphological and cytological data, therefore, suggest that this triploid is not an auto-polyploid but a definite allo-polyploid arising from a cross between a diploid and a tetraploid. The fact that *Cynodon Magennisii* does not set seed supports the observation made by many workers that triploids are nearly always sexually sterile, since they cannot undergo regular reduction owing to the odd number of chromosomes.

That *Cynodon dactylon* is a tetraploid serves to explain many of the characteristics of this species. As is often typical of tetraploid forms this grass is larger in size, more vigorous in growth, and altogether hardier than the diploid form. *Cynodon dactylon* has a world-wide distribution and flourishes under a variety of conditions, whereas other Cynodon species are of limited distribution and are often restricted to one particular habitat. Many systematists have remarked on the width of variation which occurs within this one species. According to Crane (1940) such variation is obviously correlated with the tetraploid nature of the plant.

It is interesting to note that *C. dactylon* is highly fertile, whereas *C. transvaalensis* rarely produces mature seed. Darlington (1940) observes that a polyploid which has arisen from a non-hybrid diploid is less fertile than the diploid parent, whereas doubling of the chromosomes in a more or less sterile hybrid results in a polyploid which is fairly fertile and, in proportion to its fertility, true-breeding. It would appear, therefore, that the origin of a fertile tetraploid has a sound genetic basis, and that *C. dactylon* possibly arose from the doubling of chromosomes in a fairly sterile diploid ancestor.

*C. dactylon var. densus* (Hall's Selection) resembles *C. dactylon* in many respects; both have the same chromosome number, their leaf anatomy is almost identical, and as regards most features of external morphology they are closely similar. But whereas *C. dactylon* is a vigorous grass which may reach a height of 40 cm. and is fairly fertile, *C. dactylon var. densus* is a slow-growing, prostrate, tufted grass which rarely sets seed. The available data, therefore, suggest that "Hall's Selection" is merely a variety of *C. dactylon*.

Stent (1927) considers both *C. Bradleyi* and *C. transvaalensis* to be natural hybrids between *C. dactylon* and *C. hirsutus*. This does not seem probable in the light of a numerical comparison of the chromosomes of the three first-mentioned species. However, the chromosome number of *C. hirsutus* must be determined before any statement can be made. Certainly the fact that *C. transvaalensis* rarely sets seed and that *C. Bradleyi* is completely sterile does suggest that these two species might have a hybrid origin.

## Comparison of the Chromosome Numbers with those Recorded in the Literature.

Hunter's chromosome number of 30 for *C. dactylon* supports the writer's assumption that 10 is the basic number of the Cynodon genus. But, whereas the writer found *C. dactylon* to be a tetraploid, Hunter finds it to be a triploid.

The numbers obtained by both Janaki Ammal and Avdulow for Cynodon species are at variance with those determined by the writer. These two workers maintain that the basic number of the Cynodon genus is 9, since they both find 36 chromosomes in *C. dactylon* and Janaki Ammal records a diploid count of 18 for *C. diploidum*.

To assume that the Cynodon genus has two basic numbers of 9 and 10 corresponding to two separate lines of development would appear to solve this problem of conflicting chromosome numbers. However, the reasons why the writer considers *C. Bradleyi* to be an aneuploid species derived from an ancestor with a basic number of 10 rather than a diploid species with a basic number of 9, have already been given. Also, *C. dactylon* according to Janaki Ammal and Avdulow should fall into the 9-series, while according to the writer it should be included in the 10-series. From a study of the literature and of this present work, it is clear that *Cynodon dactylon* is reported to have three different chromosome numbers—30, 36 and 40. Unfortunately, not one of the workers mentioned describes the morphology of the grass studied, so that it is impossible to make any comparison. It is therefore probable that these three numbers refer not to one species, but to three different species of Cynodon. It appears therefore that the problem concerning the basic number of the Cynodon genus cannot be solved until the chromosome complements of all the known species within the genus have been critically examined. The writer is convinced that such a cytological examination must be accompanied by a careful morphological description of each grass studied.

Conclusions :

The problem of the taxonomic relationships of the Cynodon species selected was elucidated by a study of their external morphology, leaf anatomy, and chromosome number. The results of the cytological and morphological research showed a remarkable uniformity, and it is certain that the number of chromosomes was a useful additional character in the determination of the position of these species whose relationships would otherwise have been uncertain.

A detailed examination of the external morphology showed that the species do not differ greatly. The only reliable and constant characters are the vernation of the leaves, the presence or absence of rhizomes, the nature of the produced rachilla, and the length of the glumes in relation to that of the spikelet.

From a critical study of the leaf anatomy it was concluded that the only reliable diagnostic features are the nature of the abaxial epidermis and the number of first order bundles present. A diagnostic key to the

species was based on characters of external morphology in conjunction with anatomical characters.

The chromosome numbers indicated that the basic number of the genus is 10 and that the species form a polyploid series in which *Cynodon transvaalensis* is the diploid form, *Cynodon Magennisii* the triploid, and *Cynodon dactylon* and *Cynodon dactylon var. densus* both tetraploid forms. *Cynodon Bradleyi* with a somatic number of 18 was assumed to be an aneuploid species.

A careful study of all the available data led to the following conclusions as regards the systematic relationship of the Cynodon species studied :

(1) *Cynodon dactylon* Pers., *Cynodon transvaalensis* Burtt Davy and *C. Bradleyi* Stent were found to be well-defined species.

(2) *Cynodon Magennisii* sp. nov. was found to be a hybrid between *Cynodon dactylon* and *Cynodon transvaalensis*.
The writer conferred specific rank on this hybrid because it remains true to type as it reproduces only by vegetative means.

(3) The grass known commonly as " Hall's Selection " differed from *Cynodon dactylon* only as regards size and growth form. The writer therefore considered this grass to be a variety of *Cynodon dactylon* and referred to it as *Cynodon dactylon* Pers. *var. densus* var. nov.

The above paper is a summary of a thesis presented for the degree of M.Sc. in Botany at the University of the Witwatersrand.

The writer is continuing with this work and is at present studying the remaining South African Cynodon species, namely, *Cynodon incompletus* Nees, *Cynodon hirsutus* Stent and *Cynodon plectostachyum* Pilg.

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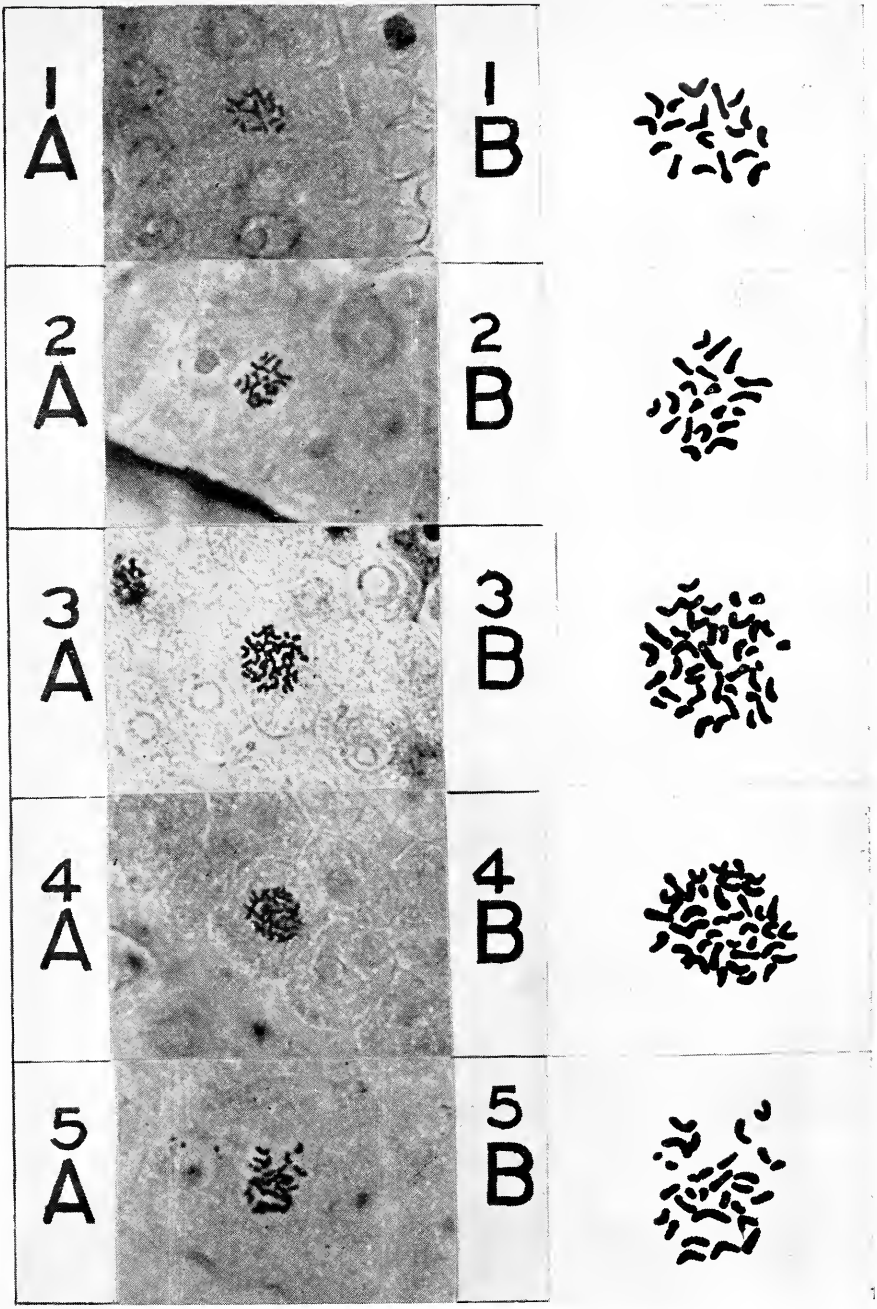


PLATE XVII.

SOMATIC CHROMOSOMES OF CYNODON SPECIES.

1. C. Bradleyi Stent.
2. C. transvaalensis Burtt Davy.
3. C. dactylon Pers.
4. C. dactylon Pers var. densus var. nov.
5. C. Magennisii sp. nov.

1A—5A : Photomicrographs of Metaphase Plates, 1150 ×.

1B—5B : Camera Lucida Drawings of Metaphase Plates 3,000 ×.

# REVIEWS.

Wilman, M.,Preliminary Check List of the Flowering Plants and Ferns of Griqualand West (Southern Africa). With a Farm Map by J. P. H. Acocks. Cambridge : Deighton Bell. Kimberley : Alexander McGregor Memorial Museum. 1946. pp. vii and 379. 45/- net.

There is ample evidence that the study of and indeed interest in the flora of this country is handicapped by a lack of suitable sources of information. Of the sources that exist a very large proportion deal with the subcontinent as a whole and hence are either too extensive or are too superficial in respect of any special area and do not meet the real needs. With this in mind the advent of a work on the flora of Griqualand West, a region of very great floristic and phytogeographical interest, seemed something of real importance. The hopes aroused were perhaps slightly dashed on the actual reading of this book. In the preface it is stated to be a temporary substitute for a more ambitious and complete work. It is that work that one still hopes for.

The present book is published now without the general and descriptive portions in order to fill what is stated to be a real demand. The book is a list of the plants of the divisions of Herbert, Kimberley, Barkly West and Hay, with the localities in each division for each species and references to the collections in the Museum and elsewhere. There are also some notes on habitats and frequency, and on occurrences in adjoining districts, especially Kuruman.

The arrangement followed is that adopted in the Flora Capensis. References to that work, not always correct, are given under the genera. In each genus the species are arranged alphabetically. There are included a number of species for which identification has not been possible. Following the list is a glossary of terms and abbreviations, and a list of common names with their botanical equivalents. A farm map is appended. This gives all the localities mentioned in the list, and though not very easy to read should be of real value.

A work of this kind is of most value to the phytogeographer and the specialist for whom it brings together data otherwise unobtainable. For the ordinary botanist or plant lover the absence of any descriptions or means of identification is a serious drawback and in this case one liable to be emphasised by the rather high price of the book. For these especially the full work that is promised, is a real desideratum and one hopes that its production will not be unduly delayed.

The book is well got up and the type large and readable. One wonders whether a transposition of the types used for names of families and of genera might not have made reference easier. There are a considerable number of mistakes but these seem to be errors in the manuscript and not due to the printers. When the full work appears these and some errors of nomenclature should be revised.

R. S. Adamson

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M. Henrici : The Transpiration of South African Plant Associations. Part I—Transpiration of Karoo Bushes, Sc. Bull. No. 185, 1940 ; Part II—Indigenous and Exotic Trees under semi-arid Conditions, Sc. Bull. No. 248, in press ; Part III—Indigenous and Exotic Trees in the Drakensberg Area, Sc. Bull. No. 247, in press ; Part IV—Parkland ; Forest and Sour Mountain Grassveld ; Large Karoo Bushes, Sc. Bull., No. 244, 1946. Department of Agriculture of the Union of South Africa. Government Printer, Pretoria.

This series of bulletins presents the results of transpiration studies undertaken by Dr. M. Henrici, Ph.D., D.Sc. (Senior Professional Officer, Veld Reserve, Fauresmith, O.F.S.), in the period 1932 to 1942. Parts I and IV are available in both official languages. Part II is not on sale at present because the Afrikaans translation has not been completed. Part III is in the press, but the reviewer has had the opportunity of perusing an uncorrected proof in English.

Parts II and III and portion of part IV describe investigations conducted with the specific object of finding out whether indigenous trees in South Africa transpire less than exotic trees like species of *Eucalyptus* and *Pinus*. The general conclusion arrived at is that exotics consume more water, and that they are consequently not to be recommended for planting in stream catchment areas. The data on which such a far-reaching recommendation is based need to be subjected to an objective review.

It is doubtful whether an accurate technique for measuring the transpiration of plants in the field is available to-day, and it is even more problematic whether a satisfactory procedure for estimating the use of water by associations of plants could be made available at present. Dr. Henrici's attempts to achieve these objects are also open to serious criticisms.

Dr. Henrici's technique depends on the use of the Hartmann and Braun Torsion Balance, which is used to weigh and re-weigh cut twigs, rapidly, within a few minutes after cutting. Weinmann and le Roux

(S.A. Journal of Science, 42, pp. 147-153, 1946) have made a critical study of the Torsion Balance for measuring transpiration. They found that :—

"Agreement in the rate of water loss for three minutes before and after cutting was poor. Only in approximately ten per cent. of the experiments with barley, maize, oats and fescue, and in 35 per cent. of the experiments with wheat did the transpiration rates agree within 20 per cent. The average discrepancies ranged from 49 per cent. in maize to 106 per cent. in barley.

The correlation coefficient for the actual water loss during the three minutes before and after cutting in all (85) experiments was — 0·319."

They concluded, with complete justification : "The results indicate that in the plants investigated the determination of the water loss from the cut plants cannot be regarded as a reliable index of the true transpiration rate of the intact plant."

Data yielded by a technique which is so unsatisfactory hardly warrant the definite conclusions drawn by Dr. Henrici. There are also other serious shortcomings in Dr. Henrici's experiments which must be pointed out.

Assuming that acceptable techinque had been used, Dr. Henrici would have done much better had she restricted her field to one or two plant associations. This would at once have reduced the number of species selected for observation, and also avoided very considerable variations in climate and other site factors. The number of replications of readings for individual species could then have been greatly increased. Using some other *relatively* reliable technique, she might thus have gained relative estimates of the water used by one or two associations. Dr. Henrici has set herself a particularly hard task in attempting to estimate the absolute volume of water transpired by trees and forests, which, because of their size, provide extremely difficult material for transpiration studies. It is questionable whether even relatively accurate estimates of the water used by associations of trees could be obtained.

Dr. Henrici has dispensed with statistical design in her experiments. Consequently many of the differences estimated by her and discussed at length may be statistically quite insignificant, even if they are relatively large. She has not made use of replication and randomization in order to reduce the experimental error and form a valid estimate of it. Her data show very considerable variability because of the unreliable technique used, and because of the considerable natural variability of transpiration due to differences in meteorological and soil conditions, differences in foliage material from one plant to another, and from one twig to another, even on the same plant.

Dr. Henrici does not indicate how sampling was done for the estimation of the volume of water transpired by whole trees and associations. Evidence is available that in trees shaded twigs generally transpire less than those in the sun, and that leaves near the tops of tall trees transpire less than those nearer the ground. Has Dr. Henrici taken her twigs from all parts of the tall trees she studied ? In view of the fact that the transpiration of trees probably decreases with increased height above ground-level, her hypothesis that larger, taller, exotic trees must use more moisture than lower indigenous species cannot be accepted without further data. Her statement that faster growing exotics must use more moisture than slower growing indigenous species is also not borne out by her data, which show no difference in transpiration of exotics and indigenous species per unit weight of fresh material per unit of time. Dr. Henrici's data merely tend to show that exotics use water more efficiently.

After Dr. Henrici has concluded from her data that exotic trees (especially pines) do *not* transpire more than indigenous species (part II, page 6 ; III, page 32 ; IV, page 12) she develops the hypothesis that *plantations* of exotics use more water than natural forests. These conclusions are thus derived from theorising on unreliable data. In estimating the water use of *stands* of trees on the basis of observations on cut twigs so many factors have to be taken into account that the value of the estimates is highly problematic. Such estimates by Dr. Henrici have been quoted, without justification, as scientific facts and widely used as arguments against afforestation.

C. L. Wicht.

JOURNAL

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# A REVISION OF BRUNIACEAE

By N. S. Pillans.

The first published descriptions and illustrations were of *Brunia nodiflora* and *Staavia radiata* in Jacob Breyne's *Centuria* (1679). They were the only species published up to the year 1700, but prior to that year they appeared again under new names in the works of Morison and Ray. The next published were *Berzelia lanuginosa*, by Ray (1704), and *B. abrotanoides* by Burmann (1738). Linnaeus did not include in the first edition of his *Species Plantarum* (1753) any new species which are now retained in the family. Linnaeus, the younger, published one new species in his *Supplementum* (1781). Six new species appeared in Thunberg's *Prodromus* (1794–1800). Thereafter the number increased more rapidly. The chief authors were Brongniart, in *Ann. Sc. Nat.* viii (1826), Sonder, in *Harv. and Sond. Fl. Cap.* ii (1861–62), Niedenzu, in *Engl. and Prantl. Pflanzenfam.* iii (1891) and Dümmer, in *Journ. Bot.* L, suppl. 2 (1912). The first genus, *Brunia*, was published by Linnaeus in his *Systema* (1735). The family was established by R. Brown in Clarke Abel's *Narrative of a Journey to China* (1818). It comprised the new genera *Erasma* R. Br. and *Thamnea* Solander, and the older genera *Brunia* L., *Linconia* L. (1767) and *Staavia* Dahl (1787). Subsequently several authors made about twelve new genera, chiefly for the purpose of splitting the existing genera. In the present work twelve genera, comprising seventy-five species, are maintained.

The family is endemic in South Africa. All the species, except *Raspalia trigyna,* in Natal, are confined to the Cape Province, and mostly occur in the south-western part, the greatest number being in the Caledon Division. Three occur almost throughout the south-western floral region, and one takes the family northwards from the Cape to the Calvinia Division, which is the limit in that direction. No species has been recorded in the Karroid areas or on the sea-coast. The plants are frequently gregarious, but in some species they are widely separated.

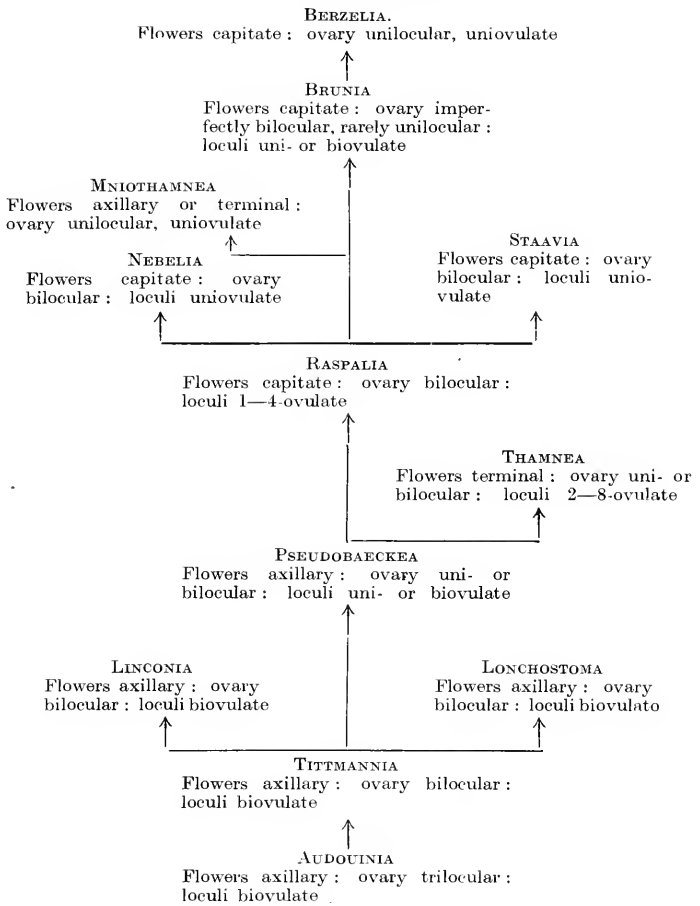
The great variations in the size, shape and surface characters of the leaves may, in some instances, suggest that more than one species have been included under the same name. But these plastic and variable species, considerably influenced by the condition of soil, moisture, light and temperature, have their extreme forms connected by plants with intermediate characters. Closely related species usually possess quite evident and constant distinguishing characters. Hybrids are unknown.

The presence of stipules in Bruniaceae was either denied or doubtfully recognised until Marloth, in his *Flora of South Africa* ii (1925), mentioned them as occurring in "some species of *Staavia* and *Berzelia.*" Additional records are now given of their presence in *Brunia, Linconia* and *Tittmannia.* Though rudimentary and often inconspicuous they are quite evident as seen under low magnification.

Fruits are imperfectly known in most genera, and in two they are unknown. Seeds are rarely seen. The number is very small in comparison to that of the flowers.

Present knowledge indicates that all the species, excepting *Berzelia lanuginosa* and possibly *Staavia radiata,* only grow in "light" soils derived from sandstone rocks. The most favoured aspects are south and south-east; some species are confined to them; some are on all aspects. Surface or underground moisture seems essential to the taller species, and all appear to reach greatest perfection in full sunlight. Very little has been recorded of the reaction of the plants to burning. The few known to possess a woody rootstock, thereby able to survive burning, are *Audouinia capitata, Berzelia abrotanoides, Brunia nodiflora* and *Staavia radiata.* The possession of a woody rootstock is apparently not common to all species in a genus.

No reliable information is available as to the methods of pollination. The probable suggestion has been made that wind is the chief agent. But insects must play some part, because large flower-beetles often visit the flowers of *Berzelia* and *Brunia.*




The accompanying diagram is to illustrate what seem to be the probable affinities between the genera and the probable direction of evolutionary development. The trend in development appears to have been from a trilocular to a unilocular ovary, and towards a reduction in the number of ovules. These modifications are usually accompanied by changes in the type of inflorescence whereby the flowers, at first axillary, become terminal and finally crowded in heads. The progress in development has often been uneven. In several genera the inflorescence, as may be expected, shows greater advancement than the ovary. Significant

changes in the structure of the ovary may be seen in *Pseudobaeckea* and *Thamnea*, where the number of chambers is either one or two, and in *Brunia*, where the transition from two to one is evident in the imperfectly formed partition between the two chambers. In *Brunia albiflora* the chambers are normally two, but they may, by abortion, be reduced to one. In *Berzelia* all traces of a second chamber have disappeared. It is a noteworthy fact that the monotypic genus *Audouinia*, having the most primitive floral characters, is the most restricted in distribution and apparently represented by the fewest individuals.

Some of the relevant literature and many of the older collectings have unfortunately not been available for the purpose of this work. However, it seems most probable that all valid and distinct species have been included. The genera are arranged in a sequence which may be in accordance with their natural affinity. In the records of distribution the political divisions are given in alphabetical order. The months are those during which the collectings were flowering. All collectings recorded in this work, unless otherwise stated, have been examined in course of preparation in the Bolus Herbarium. Only dried material has been used.

Grateful acknowledgment has to be made of the loan of herbarium material from the following institutions :— Albany Museum, Grahamstown ; Natal Herbarium, Durban ; National Herbarium, Pretoria ; National Botanic Gardens, Kirstenbosch ; and South African Museum, Cape Town. The accompanying illustrations are the work of Miss M. Walgate, to whom sincere thanks are expressed.

Publication has been financed by a grant from the S. African Council for Scientific and Industrial Research.

BRUNIACEAE, *R. Brown in Clarke Abel, Narr. Journ. China, app. B*, 374 (1818) ; *DC. Prodr.* ii, 43 (1825) ; *Brongn. in Ann. Sc. Nat.* viii, 368 (1826) ; *Harvey, Gen. S. Afr. Pl.* 126 (1838) ; *Endlicher, Gen. Pl.* 805 (1839) ; *Arnott in Hook. Journ. Bot.* iii, 259 (1841) ; *Endlicher, Enchirid.* 401 (1841) ; *Schnizlein, Iconogr.* iii (1843–70) ; *Walpers, Ann. Bot. Syst.* ii, 276 (1851) ; *Lindley, Veg. King.* ed. 3, p. 785 (1853) excl. syn. *Grubbiaceae et Ophiriaceae* ; *Sond. in Harv. & Sond. Fl. Cap.* ii, 309 (1861–62) ; *Baillon, Adans.* iii, 318 (1862–63) ; *Benth. & Hook. f. Gen. Pl.* i, 670 (1865) ; *Harvey, Gen. S. Afr. Pl.* ed. 2, p. 103 (1868) ; *Lindley, Treasury of Bot.* i, 174 (1870) ; *Baillon, Hist. Nat.* iii, pp. 384, 454 (1872) ; *Nicholson, Dict. Gard.* i, 216 (1884) ; *Niedenzu in Engl. & Prantl, Pflanzenfam.* iii, 2a, 131 (1891) ; *Henslow, S. Afr. Fl. Pl.* 142 (1903) ; *Colozza in Ann. Bot. di Roma* ii, 1 (1905) ; *Sim, Forest Flora of Cape Colony* 220 (1907) ; *Thonner, Fl. Pl. Afr.* ed. 2, p. 236 (1915) ; *Marloth, Flora of S. Afr.* ii, § 1, p. 35 (1925) ; *Hutchinson, Fam. of Flowering Pl.*

212 (1926); *Phillips, Gen. S. Afr. Fl. Pl.* 288 (1926); *Levyns, Guide to Flora of Cape Peninsula* 137 (1929).

Shrubs or undershrubs with ascending or rarely decumbent woody stems. Leaves small, alternate, closely set or imbricate, shortly petiolate or sessile, acicular, linear, lanceolate, oblanceolate, oblong, ovate or rotund, rarely cordate at the base, flat, convex or concave, trigonal or tetragonal, smooth or scabrid, glabrous or pubescent, villous or ciliate. Stipules minute, subulate, mostly absent. Flowers mostly small, actinomorphic, hermaphrodite, sessile or stipitate, subtended by a bract or bracteoles, axillary, terminal, or in globose or involucred flat-topped heads, rarely in spikes or panicles. Calyx-tube ± adnate to the ovary, calyx-lobes 5, imbricate in bud. Petals 5, perigynous or epigynous, sessile or clawed, free or rarely united into a short tube, entire, mostly bicarinate on the lower half of the ventral surface, glabrous or ± pubescent, white, cream, pink, mauve or red, imbricate in bud. Stamens 5, alternating with and inserted with the petals, free or attached to the base of the petals, very rarely inserted in the throat of the corolla, equal or unequal in length, included or exserted: anthers linear, oblong, ovate or rarely sagittate, 2-thecous, introrse or antrorse, opening by slits: thecae mostly united in the upper half, rarely almost free, parallel or diverging slightly. Ovary half-inferior to quite inferior, rarely superior, 1—3-chambered (rarely imperfectly so), with 1—12, usually collateral, pendulous ovules in each chamber. Styles 1—3, terminal, free or ± united: stigmas usually minute, papillose. Fruit (imperfectly known) dry, indehiscent and 1-seeded or dehiscing internally downwards into 1- or 2-seeded cocci, often bearing persistent calyx-lobes: seeds oblong, elliptic, rotund or angular, wrinkled or smooth, occasionally clasped by a basal aril: embryo minute, next the hilum: endosperm fleshy.

### Key to the Genera.

Petals united at least a quarter of their length; filaments almost entirely merged in the corolla-tube .. .. 132 (iv) *Lonchostoma*

Petals free or almost so; filaments free:

Ovary unilocular:

Stamens shorter than the petals, curved inwards .. 167 (ix) *Mniothamnea*

Stamens longer than the petals, curved outwards .. 186 (xii) *Berzelia*

Ovary bi- or trilocular:

Styles united throughout their length:

Ovary trilocular or, very rarely, bilocular .. .. 126 (i) *Audouinia*

Ovary bilocular:

Flowers crowded in capitula .. .. .. 169 (x) *Staavia*

Flowers terminal or axillary:

Flowers terminal .. .. .. .. 143 (vi) *Thamnea*

Flowers axillary .. .. .. .. .. 127 (ii) *Tittmannia*

Styles free or almost so:

Anther-thecae diverging above the middle .. .. 130 (iii) *Linconia*

Anther-thecae not diverging above the middle:

Calyx constricted at and articulated with the top of the ovary ; calyx-tube ± tubercled .. 125 (v) *Pseudobaeckea*
Calyx not as above :
Calyx-lobes adjacent at the base, forming a V-shaped angle .. .. .. .. 149 (vii) *Raspalia*
Calyx-lobes spaced at the base :
Filaments equal in length and longer than the petals .. .. .. .. .. 161 (viii) *Nebelia*
Filaments unequal in length, not longer than the petals .. .. .. .. 178 (xi) *Brunia*

I. AUDOUINIA *Brongn. in Ann. Sc. Nat.* viii, 384, tab. xxxviii, fig 1, A—G (1826) ; *Endl. Gen.* p. 807, No. 4602 (1839) ; *Sond. in Harv. & Sond. Fl. Cap.* ii, 323 (1861—62) ; *Benth. & Hook. f. Gen. Pl.* i, 673 (1865) ; *Harv. Gen. S. Afr. Pl.* ed. 2, p. 105 (1868) ; *Nieden. in Engl. & Prantl, Pflanzenfam.* iii, pars 2a, 134 (1891) ; *Thonner, Gen. Fl. Pl. Afr.* 236 (1915) ; *Marl. Flora S. Afr.* ii, §1, 36 (1925) ; *Phillips, Gen. S. Afr. Fl. Pl.* 289 (1926) ; *Levyns, Guide to Flora of Cape Peninsula* 138 (1929). **Pavinda** *Thunb. ex Bartling, Ordin.* 374 (1830).

Undershrubs. Leaves sessile, imbricate, linear, convex below, hispid, ciliate. Stipules absent. Flowers conspicuous, axillary, on a short bracteolate stipe, crowded in spiciform or capituliform inflorescences. Calyx-tube broadly obconic, glabrous, adhering to the ovary throughout : calyx-lobes broadly obovate-oblong, nervose, scarious, ciliate. Petals free, consisting of a linear bicarinate claw widening upwards into a circular lamina, glabrous. Stamens shortly exserted : anthers lanceolate-linear : thecae free in the basal third. Ovary half-inferior, trilocular [rarely, by abortion, bilocular], with 2 ovules in each chamber, flat across the top, glabrous : styles 3, connate throughout, shortly exserted : stigmas small, diverging. Fruit unknown.

Named in honour of J. V. Audouin, professor of natural history in Paris.

**A. capitata** *Brongn. in Ann. Sc. Nat.* viii, 384, tab. xxxviii, fig. 1, A—G (1826) ; *Ecklon & Zeyher, Enum. Pl.* 142 (1835) ; *Sond. in Harv. & Sond. Fl. Cap.* ii, 323 ; *Nieden. in Engl. & Prantl, Pflanzenfam.* iii, 2a, pp. 133, 134, fig. 75, 0 (1891) ; *Colozza in Nuov. Giorn. Bot. Ital.* x, pp. 27, 31 (1903) ; *Engl. & Drude, Veget. Erde* ix, 1, 2, p. 487, fig. 0 (1910) ; *Dümmer in Journ. Bot.* L, suppl. 2, p. 32 (1912) ; *Marl. Flora S. Afr.* ii, § 1, pp. 36, 38, tab. 13, B, figs. 1—4 (1925). **Diosma capitata** *Linn. Mant.* ii, 210 (1767) ; ej. *Syst. Veg.*, ed. 13, p. 199 (1774), ed. 14, p. 239 (1784) ; *Thunb. Prodr. Pl. Cap.* 43 (1794) ; *Linn. Syst. Veg.* ed. 15, p. 250 (1797) ; *Willd. Sp. Pl.* i, §2, p. 1136 (1797) ; *Thunb. Fl. Cap.* ed. Schultes 223 (1823) ; *D. C. Prodr.* i, 717 (1824). **Diosma imbricatum** *Dumont de Cours. Bot. Cult.* ed. 2, v, 405 (1811). **Pavinda capensis** *Retz. ex Steud. Nom.* ed. 2, ii, 279 (1841).

Usually about 40 cm. high, moderately branched or, as the result of burning, with virgate stems. Branchlets shortly villous. Leaves mostly 4—8 mm. long, ascending, slightly incurved towards the apex, obtuse, rounded-convex and at first hispid beneath, bisulcate and ± above, rough all over with swollen hair-bases. Flowers in the axils of slightly reduced leaves, crowded in oblong or rotund inflorescences commonly 1·5—5 cm. long (up to 10 cm. on virgate stems arising from a burnt rootstock). Bracteoles usually 8, imbricate, ovate, obtuse, navicular, ciliate on the upper half, the lowermost 1·5 mm. long, the uppermost 4·5 mm. long. Calyx-lobes 6—7 mm. long, very obtuse, concave above, with a prominent median nerve and many lesser nerves beneath, with silky cilia on the upper half. Petals about 9 mm. long, with a scarlet spreading lamina about 4 mm. long. Ovary tri- or, rarely by abortion, bilocular: ovules collateral, pendulous: stylar column trigonous, exserted for about ⅓ of its length.

Caledon Div.: Klein Riviers Berg and Hemel en Aarde, Aug. *Zeyher* 2653; Hanglip and Hemel en Aarde, May, *Ecklon & Zeyher* 1085.—Cape Div.: Muizenberg and Simon's Town, May, *Ecklon & Zeyher* 1085a; near Simon's Town, *MacOwan* 3010, *Marloth* 91, *Morgan* (July) in Bolus Herb. 4821; Fish Hoek, 700 ft. *Bolus* 23048; Karbonkelberg, west side, 500 ft. July, *Compton* 5312; Kommetjie Area, *Peers* in Bolus Herb. 23047; Klein Slangkop, Sept. *W. Dod* 1556; Bonteberg, June, *Compton* 8916; Olifants Bosch, Oct. *Salter* 3949; near Cape Point, *MacOwan* in Herb. Austr.-Afr. 1459.—Stellenbosch Div.: Sir Lowry's Pass, June, *de Jongh* in Galpin Herb. 3521.

II. TITTMANNIA *Brongn. in Ann. Sc. Nat.* viii, 385 (1826) non *Reichb.*; *G. Don, Gen. Syst.* ii, 49 (1832); *Endl. Gen.* 807, No. 4603 (1839); *Sond. in Harv. & Sond. Fl. Cap.* ii, 312 (1861—62); *Benth. & Hook. f. Gen. Pl.* i, 671 (1865); *Harv. Gen. S. Afr. Pl.* ed. 2, p. 104 (1868); *Nieden. in Engl. & Prantl, Pflanzenfam.* iii, 2a, 134 (1891); *Dümmer in Journ. Bot.* L, suppl. 2, p. 16 (1912); *Thonner, Fl. Pl. Afr.* 236 (1915); *Marloth, Fl. S. Afr.* ii, § 1, p. 37 (1925); *Phillips, Gen. S. Afr. Fl. Pl.* 289 (1926); *Nieden. & Harms in Engl. Pflanzenfam.* Aufl. 2, xviiia, 298 (1930). **Moesslera** *Reichb. in Moessler, Handb.* ed. 2, i, 1 (1827); ej. *Consp.* 160 (1828); *Meissn. Gen.* 72 (1836). **Thamnea** *Baillon, Hist. Nat.* iii, 388 (1872) non *Solander.*

Densely branched undershrubs. Leaves imbricate, sessile, linear or lanceolate, convex above and beneath, scabridous or smooth, hispid or glabrous. Stipules minute, ustulate. Flowers small, subtended by 5—8 bracteoles, shortly pedicellate, axillary near the ends of the branchlets. Calyx-tube obconic or rotund, tubercled and papillate or sulcate, glabrous,

adhering to the ovary throughout : calyx-lobes imbricate at the base, lanceolate, cartilaginous, glabrous or ciliate. Petals free, ovate, obovate or consisting of an oblong claw widening upwards into an ovate lamina, bicarinate at the base, glabrous. Stamens included : anthers lanceolate or lanceolate-oblong : thecae free in the lower half. Ovary $\frac{3}{4}$ inferior, with 2 biovulate chambers : styles 2, included, connate throughout in a stout column : stigmas indistinct or distinct, diverging. Fruit imperfectly known, rotund, conspicuously tubercled, 1-seeded.

Named in honour of J. A. Tittmann, a German botanist.

KEY TO THE SPECIES.

| | |
|---|---|
| Calyx-tube not tubercled .. .. .. .. .. .. | (2) *laevis* |
| Calyx-tube tubercled : | |
| Leaves hispid ; petals ovate or consisting of a very short basal claw and an ovate lamina .. .. .. .. .. | (3) *hispida* |
| Leaves without hairs ; petals obovate .. .. .. .. | (1) *laxa* |

1. **T. laxa** *Presl, Bot. Bemerk.* 39 (1844) ; *Sond. in Harv. & Sond. Fl. Cap.* ii, 313 (1861–62) ; *Nieden. in Engl. & Prantl, Pflanzenfam.* iii 2a, 134 (1891) ; *Colozza in Ann. Bot. di Roma* ii, pp. 26, 38 (1905) ; *Dümmer in Journ. Bot.* L, suppl. 2, p. 16 (1912). **Brunia laxa** *Thunb. Prodr. Pl. Cap.* 187 (1800) ; *Pers. Syn. Pl.* 1, 246 (1805) ; *Lam. Encycl.* suppl. i, 712 (1810) ; *Thunb. Fl. Cap.* ed. Schultes 206 (1823) ; *DC. Prodr.* ii, 44 (1825). **Tittmannia lateriflora** *Brongn. in Ann. Sc. Nat.* viii, 385, tab. 38, fig. 2 (1826) ; *Schnizlein, Iconogr.* iii, t. 168 figs. 26, 28 (1857—65). **Moesslera lateriflora** *Ecklon & Zeyher, Enum. Pl.* 142 (1835) absque descr. **Thamnea laxa** *Baillon, Hist. Nat.* iii, 388 (1872). **Tittmannia Oliveri** *Dümmer in Journ. Bot.* L, suppl. 2, p. 16 (1912)! **T. pruinosa** *Dümmer* op. cit. p. 17 !

Usually 40—60 cm. high. Branchlets slender, minutely hispid. Leaves 1—6 (mostly 4) mm. long, erect-spreading, ascending or imbricate, straight, slightly incurved or recurved above the middle, linear, linear-lanceolate or lanceolate, obtuse or subacute, at first apiculate, rounded-convex or slightly keeled on the back, slightly convex and ± keeled on the ventral face, scabridous on one or both surfaces, usually becoming smooth or almost so. Pedicels about 1 mm. long. Bracteoles 6 or 7, closely imbricate at the base of the calyx, 1 mm. long, ovate or ovate-lanceolate, subacute, ciliate. Calyx-tube narrowly obconic, tubercled : calyx-lobes about 1·25 mm. long, bluntly keeled on the dorsal surface, slightly concave on the ventral surface, minutely ciliate. Petals 2 mm. long, obovate, white. Anthers 0·5 mm. long, lanceolate, obtuse, reaching to the middle of the petals. Ovary papillate at the top : stylar column 0·5 mm. long : stigmas indistinct. Fruit bearing tubercles arranged in columns.

Ceres Div.: Koude Bokkeveld, 4500 ft. Sept. *Schlechter* 8874; seven miles beyond Gydouw Pass, Oct. *Hutchinson* 1029; Skurfdeberg, Wagenbooms River, 6000 ft. Jan. *Schlechter* 10154; Skurfdeberg, near Gydouw, Dec. *Bodkin* in Herb. Norm. Austr.-Afr. 1153; near Ceres, Slab Peak, on rocks, Oct. *Esterhuysen* 6156; mountains near Ceres, Dec. *Stokoe* 2822, 6018, in Nat. Herb. Pretoria 15906; Skilderberg, Dec. *Stokoe* 2648, 2650; Mostert's Berg, 3000 ft. Jan. *Schlechter* 257; near Gideon's Kop, Nov. *Stokoe* in S. Afr. Mus. Herb. 54513.—Clanwilliam Div.: Cederberg, Nov. *Stokoe* 7325, *Primos* in Marloth Herb. 11714; peak at Kouwpoort, 4000—5000 ft. Oct. *Esterhuysen* 12145; Heuning Vlei, Dec. *Stokoe* in S. Afr. Mus. Herb. 56820; Middelberg Plateau, on peak, Dec. *Esterhuysen* 2462; Pakhuis, Dec. *Esterhuysen* 7406, Bolus (Oct.) 23033; Grootberg, 4000 ft. Dec. *Esterhuysen* 4172; Suurvleiberg, upper south-east slopes, *Esterhuysen* 2539; Elands Kloof, Oct. *Esterhuysen* 3377, *Stokoe* in S. Afr. Mus. Herb. 56819; Ertjesland Kloof, Sept. *Compton* 16093.—Paarl Div.: mountains south of Wemmerskoek, *Andreae* 741; Drakenstein Mts., Oct. *Drège* in S. Afr. Mus. Herb. 37685; Haalspitzkop, on rocks near the summit, 4600 ft. Oct. *Stokoe* 1300.—Piquetberg Div.: Piquetberg, 1500 ft. Oct. *Bolus* 13549.—Stellenbosch Div.: Jonkershoek, *Marloth* 1844.—Tulbagh Div.: between Tulbagh Kloof and Elands Kloof, *Drège* in Nat. Herb. Pretoria 9593; hills near Tulbagh Waterfall, Dec. *Ecklon & Zeyher* 1086; Witzenberg, 5500 ft. *Primos* in Bolus Herb. 23034.—Worcester Div.: Matroosberg, 5400 ft. Jan. *A. Bolus* in Bolus Herb. 6363, in Guthrie Herb. 4403, *Marloth* 2261, 2354; top of Brandwacht Mt. 6000 ft. March, *Stokoe* 1963; Bonteberg, Eikenbosch Hoek, south slopes, 3500—4000 ft. Nov. *Esterhuysen* 3657.

**Var. β, langebergensis** var. nov.; leaves mostly 3—5 mm. long, erect-spreading, linear or linear-lanceolate, slightly scabrid beneath, glabrous, minutely dentate-ciliate; bracteoles about 5, ovate; calyx-lobes 1·5—1·75 mm. long, oblong-lanceolate, stoutly nervose-carinate; petals 2·5 mm. long; stylar column 1·25 mm. long.

Montagu Div.: summit of mountains near Montagu, 2300 ft. Dec. *Bolus* 6707 (type in Bolus Herb.); Kogman's Kloof, Oct. *Barnard* 705.

2. **T. laevis** sp. nov.; ramulis minute pubescentibus; foliis linearibus obtusis glabris utrinque convexis; bracteolis ovato-lanceolatis ciliatis arte imbricatis; tubo calyce sulcato; sepalis nervo-carinatis ciliatis; petalis ovatis glabris basin versus constrictis; antheris lanceolato-oblongis; ovario biloculari; loculis biovulatis; stylis duobus connatis.

About 50 cm. high. Branchlets very minutely pubescent. Leaves 2—4 mm. long, linear, obtuse, slightly widened at the base, slightly incurved above the middle, rather acutely convex on both surfaces, very

minutely ciliolate on the margins, smooth and glabrous elsewhere. Pedicels 0·5 mm. long. Bracteoles about 8, closely imbricate, 1·5 mm. long, ovate-lanceolate, subacute, ciliate, bluntly nervose-carinate. Calyx-tube rotund, longitudinally sulcate : calyx-lobes 1·5 mm. long, nervose-carinate, ciliate. Petals 2·5 mm. long, white, consisting of an oblong claw widening upwards into an ovate obtuse or acute lamina Anthers 0·75 mm. long, lanceolate-oblong, obtuse. Stylar column 0·5 mm. long, broad-based : stigmas distinct. Fruit unknown.

Paarl Div. : Winterberg, 5500 ft. Dec. 1943, *Esterhuysen* 9629 (type in Bolus Herb.) ; Haalspitzkop, 4600 ft. Oct. *Stokoe* 1300 ; Bain's Kloof Area, Oct. *Worsdell* in Bolus Herb. 22947.

The affinity is with *T. laxa* from which it is easily distinguished by the absence of tubercles from the calyx-tube which is remarkable for its furrowed surface.

3. **T. hispida** sp. nov. ; ramulis hispidulis ; foliis linearibus obtusis, supra carinatis, subtus obtuse convexis ; bracteolis ovato-lanceolatis ciliatis ; tubo calyce tuberculato ; sepalis lanceolatis glabris obtuse carinatis ; petalis ovatis basin versus saepe constrictis ; antheris lanceolatis ; ovario apice papillato ; stylis duobus connatis.

About 60 cm. high. Branchlets hispidulous. Leaves about 4 mm. long at maturity, linear, slightly narrowed towards the base, obtuse, ustulate at the apex, rounded-convex beneath, slightly convex and keeled above, slightly incurved from the middle, hispid on both surfaces. Flowers several or many together : pedicels 0·5 mm. long. Bracteoles about 8, 1 mm. long, ovate-lanceolate, obtuse, ciliate. Calyx-tube narrowly obconic, tubercled : calyx-lobes 0·75 mm. long, lanceolate, acute, glabrous, bluntly keeled. Petals 2·5 mm. long, ovate, obtuse, with the basal part often narrowed, white. Anthers scarcely 0·75 mm. long, lanceolate, obtuse, reaching to the upper half of the petals. Ovary papillate round the top : stylar column 1 mm. long : stigmas rotund, indistinct. Fruit unknown.

Tulbagh Div. : Bailey's Peak, Nov. *Stokoe* in S. Afr. Mus. Herb. 56818.—Worcester Div. : Brandwacht Mt. 5000 ft. April, 1929, *Stokoe* in Bolus Herb. 18936 (type) ; Waaihoek Plateau, 5000 ft. May, *Stokoe* 8814.

Allied to *T. laxa*, but distinguished by its hispid leaves and ovate petals. Upper parts of the plant resemble the more slender growths of *Lycopodium clavatum* L.

III. LINCONIA *Linn. Mant.* 216 (1767) ; ej. *Syst. veg.* ed. 13, p. 215 (1791) ; ed. 15, p. 274 (1797) ; *Willd. Sp. Pl.* i. pars 2, p. 1296 (1798) ; *Swartz in Ges. Naturf. Fr. Berl. Mag.* iv, 85, tab. 4 (1810) ; *Thunb.*

*Fl. Cap.* ed. Schultes 243 (1823); *D.C. Prodr.* ii, 45 (1825); *Brongn. in Ann Sc. Nat.* viii, 382 (1826); *Harv. Gen. S. Afr. Pl.* 127 (1838); *Endl. Gen.* 807, no. 4601 (1839); *Richter, Syst.* 238 (1840); *Arnott in Hook. Journ. Bot.* iii, 260 (1841); *Sond. in Harv. & Sond. Fl. Cap.* ii, 317 (1861–62); *Benth. & Hook f. Gen. Pl.* i, 672 (1865); *Harv. Gen. S. Afr. Pl.* ed. 2, p. 105 (1868); *Nieden. in Engl. & Prantl, Pflanzenfam.* iii, 2a, 133 (1891); *Thonner Fl. Pl. Afr.* 237 (1915); *Marl. Flora S. Afr.* ii, § 1, p. 37 (1925); *Phillips, Gen. S. Afr. Pl.* 290 (1926).

Undershrubs. Leaves imbricate, petiolate, linear or oblong, trigonous, ciliate or glabrous. Stipules minute, subulate, ustulate. Flowers axillary, sessile or stipitate, subtended by 4—6 bracteoles, few or many together near the ends of the branchlets. Calyx-tube obconic, glabrous, adhering to the ovary except for a narrow upper margin: calyx-lobes valvate, broadly deltoid, glabrous. Petals free, obovate or linear-oblong, convex beneath, cartilaginous, glabrous, bicarinate on the lower half or thickened near the base. Stamens included: anthers sagittate: thecae connate and abortive in the uppermost $\frac{1}{3}$, thence diverging. Ovary $\frac{2}{3}$—$\frac{1}{2}$ inferior, slightly convex or conical at the top, glabrous, with 2 biovulate chambers: styles 2, included, free, sulcate: stigmas small, obtuse. Fruit unknown.

Named in honour of some forgotten person.

Key to the Species.

| | |
|---|---|
| Leaves lanceolate-linear, mostly 1·5—2 cm. long .. .. | (1) *alopecuroidea* |
| Leaves oblong or ovate-oblong, mostly less than 1 cm. in length: | |
| Leaves 0·5—1 cm. long, at first pilose on the lower margins; bracteoles about 2·5 mm. long; petals about 3·5 mm. long .. .. .. .. .. .. .. | (2) *cuspidata* |
| Leaves 0·4—0·6 cm. long, glabrous; bracteoles about 1·75 mm. long; petals 2·75 mm. long.. .. .. | (3) *deusta* |

1. **L. alopecuroidea**. *Linn. Mant.* 216 (1767); ej. *Syst. Veg.* ed. 14, p. 261 (1784); ed. 15, p. 274 (1797); *Willd. Sp. Pl.* i, pars 2, p. 1296 (1798); *Pers. Syn. Pl.* i, 290 (1825); *Thunb. Fl. Cap.* ed. Schultes 243 (1823); *Linn. Syst. Veg.* ed. 16, p. 868 (1825); *DC. Prodr.* ii, 45 (1825); *Brongn. in Ann. Sc. Nat.* viii, 383, tab. 37, fig. 3 (1826); *Richter, Syst.* 238 (1840); *Schnizlein, Iconogr.* iii, tab. 168, fig. 25 (1843–70); *Sond. in Harv. & Sond. Fl. Cap.* ii, 318 (1861–62); *Dümmer in Journ. Bot.* L, suppl. 2, p. 32 (1912); *Marl. Flora S. Afr.* ii, § 1, p. 37, fig. 20 (1925); *Phillips in Fl. Pl. S. Afr.* x tab. 385 (1930). **L. cuspidata** *Ecklon & Zeyher, Enum. Pl.* 141 (1835) absque descr., non Swartz, excl. syn. Thunb.

About 60 cm. high, moderately branched. Branchlets and upper parts of branches villous. Leaves mostly 1·5—2 cm. long, erect-spreading,

lanceolate-linear, obtuse, apiculate, ± concave above, bluntly keeled beneath, scabrid, pilose at the margins, becoming glabrous. Flowers shortly stipitate, in dense spiciform inflorescences 1·5 cm. long, 1·5—2 cm. wide. Bractcoles usually 4—6, about 6 mm. long, clasping the calyx and base of the corolla, ovate, acute, deeply concave, pilose at the margins; the outer pilose on the dorsal keel. Calyx-lobes 0·5 mm. long, obtuse or rounded. Petals 0·9—1 cm. long, linear-oblong, obtuse, erect-spreading from near the base, deeply concave above, rounded beneath, very pale pink, with a pocket at the base. Anthers about 2 mm. long, sagittate, obtuse, reaching to near the tips of the petals: filaments much compressed, stoutly keeled on the inner face. Ovary ½ inferior, conical in the upper half: styles reaching to near the tips of the petals, stout, deeply furrowed on the inner face.

Swellendam Div.: mountains at Voormansbosch, Oct. *Pappe* in S. Afr. Mus. Herb. 15802; Langebergen near Swellendam, 2500 ft. *Schlechter* 2050; Zuurbraak Mt. c. 1500 ft. Oct. *Galpin* 4044.—Riversdale Div.: Kannaland, near Gouritz River, *Ecklon & Zeyher* in Nat. Herb. Pretoria 12082; Langebergen, Sept. *Muir* 2788.—Humansdorp Div.: Kromme River, *Ecklon & Zeyher* 1083.

2. **L. cuspidata.** *Swartz in Ges. Naturf. Fr. Berl. Mag.* v, 284, tab. 7, fig. 1 (1811); *Linn. Syst. Veg.* ed. 16, p. 868 (1825); *DC. Prodr.* ii, 45 (1825); *Brongn. in Ann. Sc. Nat.* viii, 383 (1826); *Sond. in Harv. & Sond. Fl. Cap.* ii, 318 (1861–62). **Diosma cuspidata.** *Thunb. in Hoffm. Phytog. Bl.* i, p. 24 (1803); ej. *Fl. Cap.* ed. Schultes 227 (1823).

About 30 cm. high, much branched. Branchlets villous. Leaves mostly 0·5—1 cm. long, erect-spreading, oblong, linear- or lanceolate-oblong, obtuse, apiculate, bluntly keeled beneath, concave above, at first pilose on the lower margins and persistent petiole. Flowers, sometimes 2 in an axil, in hemispheric inflorescences mostly 0·8—1 cm. long. Bracteoles 4, about 2·5 mm. long, ovate, obtuse, apiculate, bluntly keeled beneath, ciliate. Petals about 3·5 mm. long, ascending, broad-based, obovate, subacute, convex beneath, slightly incurved at the upper margins, thickened on the median part of the lower half, cream-coloured. Stamens reaching to well above the middle of the petals: filaments much compressed, furrowed on the dorsal face: anthers scarcely 0·75 mm. long. Ovary ⅔ inferior: styles reaching to well above the middle of the petals, diverging at the apex.

Paarl Div.: mountains near French Hoek, c. 4000 ft. Nov. *Schlechter* 9273.—Caledon Div.: Klein River Mts. Oct. Jan. *Stokoe* 3550, 6016, in S. Afr. Mus. Herb. 49820; Landdrost Kop, rock-crevices, Nov. *Stokoe* 2852, 4006, 7631; head of ravine on Landdrost Kop, Dec. *Esterhuysen* 2619; east slopes of Somerset Sneeuwkop, 4000 ft. Dec. *Esterhuysen*

2618 ; crevices on west side of Somerset Sneeuwkop, 4000 ft. Dec. *Esterhuysen* 12492 ; Somerset Sneeuwkop, Nov. *Stokoe* 6752 ; Kogelberg, 2000 ft. Nov. *Compton* 16547 ; banks of Rooi Els River, Jan. *Stokoe* in Bolus Herb. 17366.

3. **L. deusta** *Pillans* comb. nov. **Diosma deusta** *Thunb. in Hoffm. Phytogr. Blaetter* i, 25 (1803) ; *in Weber & Mohr, Archiv.* i, 27 (1804) ; *Thunb. Fl. Cap.* ed. Schultes 224 (1823). **Linconia thymifolia** *Swartz in Ges. Naturf. Fr. Berl. Mag.* iv, 86, tab. 4 (1810) ; *DC. Prodr.* ii, 45 (1825) ; *Sond. in Harv. & Sond. Fl. Cap.* ii, 318 (1861–62) ; *Dümmer in Journ. Bot.* L, suppl. 2, p. 32 (1912).

About 40 cm. high, much branched. Branchlets slender, pubescent. Leaves mostly 4—6 mm. long, erect-spreading, ovate-oblong or oblong, very obtuse, apiculate, bluntly keeled beneath, slightly concave above, scabridous on the margins, glabrous. Bracteoles 4, opposite, about 1·75 mm. long, ovate or rotund, obtuse, shortly apiculate, convex and very slightly keeled on the back, ciliate. Petals 2·75 mm. long, ascending, obovate, obtuse, slightly keeled on the back, bicarinate on the lower half of the inner face. Stamens reaching to well above the middle of the petals : filaments stout, slightly compressed : anthers 1 mm. long. Ovary $\frac{2}{3}$ inferior : styles furrowed on the inner face.

Caledon Div. : Rivier Zonder Einde Mts., Appels Kraal, Sept. *Zeyher* 2651.

IV. LONCHOSTOMA *Wikstr. in Vet. Acad. Handl. Stockholm*, 350 (1818); *Endl. Gen.* 669, no. 3877 (1839); *DC. Prodr.* xiii, § 1, p. 580 (1852) ; *Sond. in Harv. & Sond. Fl. Cap.* ii, 316 (1861–62) ; *Benth. & Hook. f. Gen. Pl.* i, 673 (1865) ; *Harv. Gen. S. Afr. Pl.* ed. 2, p. 105 (1868) ; *Lindley, Treasury of Bot.* ii, 694 (1870) ; *Nieden. in Engl. & Prantl, Pflanzenfam.* iii, 2a, 135 (1891) ; *Thonner, Fl. Pl. Afr.* 237 (1915) ; *Marl. Flora S. Afr.* ii, §1, p. 37 (1925); *Phillips, Gen. S. Afr. Fl. Pl.* 290 (1926). **Pyxostoma** *Vahl in Danske Nat. Selsk. Skriv.* vi, 95 (1810). **Erasma** *R. Br. in Clarke Abel, Narr. Journ. China* app. B. 374 (1818) nomen. **Gravenhorstia** *Nees in Lindl. Nat. Syst.* ed. 2, p. 439 (1836) ; *Endl. Gen.* 669, no. 3877, p. 808, no. 1606 (1839). **Peliotis** *E. Mey. in Drège, Zwei Pfl. Doc.* 210 (1844) nomen.

Undershrubs. Leaves imbricate, sessile, ovate, oblong-lanceolate, obovate or oblanceolate, convex and villous beneath. Stipules absent. Flowers axillary, sessile, subtended by 2 bracteoles, in dense inflorescences. Calyx-tube obconic or obovate-oblong, glabrous, adhering to the ovary throughout, with a free cup-shaped upper part or quite free from the ovary : calyx-lobes ovate, lanceolate, linear or ovate-deltoid, villous, pubescent or glabrous on the back. Petals connate $\frac{1}{4}$–$\frac{2}{3}$ of their length,

glabrous ; the free part ovate, ovate-oblanceolate or consisting of a linear or cuneate-oblong claw widening upwards into an ovate or obovate lamina. Stamens included or exserted, inserted at the mouth of the corolla-tube or adnate to the lower margins of the petals : anthers sagittate or with the thecae adjacent but free in the lower half. Ovary superior or half inferior, elliptic, globose or obovate-oblong, dorsally compressed, pubescent, villous or glabrous, bilocular, 2–24-ovulate : styles 2, free or for the most part connate, included : stigmas globose. Fruit (imperfectly known) dehiscent.

Name from the Greek *logche*, a lance and *stoma*, a mouth.

KEY TO THE SPECIES.

| | |
|---|---|
| Styles connate throughout or almost so .. .. .. .. | (1) *monogynum* |
| Styles quite free : | |
| Styles shorter than the corolla-tube .. .. .. .. | (2) *pentandrum* |
| Styles longer than the corolla-tube : | |
| Petals connate almost $\frac{2}{3}$ of their length .. .. .. | (3) *myrtoides* |
| Petals connate scarcely $\frac{1}{4}$ of their length .. .. .. | (4) *purpureum* |

1. **L. monogynum** *Pillans* comb. nov. **Ptyxostoma monogyna** *Vahl in Danske Nat. Selsk. Skriv.* vi, 96 (1810). **Gravenhorstia fastigiata** *Nees in Lindl. Nat. Syst.* ed. 2, p. 439 (1836). **Peliotis detrita** *E. Mey. in Drège, Zwei Pfl. Doc.* 210 (1844)! nomen ; ex *Sond. in Harv. & Sond. Fl. Cap.* ii, 317 (1861-62). **Lonchostoma monostylis** *Sond. l.c.* ; *Engl. & Drude, Veget. Erde* ix, 1, 2, p. 487, *figs.* L–N (1910) ; *Dümmer in Journ. Bot.* L, suppl. 2, p. 33 (1912) ; *Phillips in Fl. Pl. S. Afr.* iii, tab. 118 (1923).

Usually 60—90 cm. high. Branchlets villous. Leaves mostly 4—6 mm. long, erect-spreading, ascending or appressed, at first shortly imbricate, ovate, oblong-lanceolate or ovate with the lower part narrowing to the base, acute, convex and villous beneath where ultimately glabrous or retaining hairs at the margins, concave and glabrous above. Flowers overtopping the leaves, crowded in ovate, rotund or spherical heads usually 1—1·5 cm. long. Bracteoles linear, acuminate, villous on the back, concave on the inner face, reaching to the middle of the corolla. Calyx-tube obconic, adhering throughout to the ovary or with a cup-shaped upper part : calyx-lobes 4—8 mm. long, linear or lanceolate, acuminate, flat, villous on the back. Corolla 0·8—1·1 cm. long : petals connate for about $\frac{1}{3}$ of their length in a narrowly cyathiform tube; the free part ovate-lanceolate, acute, white. Stamens as long as the tube : filaments adnate to the tube : anthers 1·5 mm. long : thecae free in the lower half, pubescent on the dorsal surface. Ovary $\frac{1}{2}$—$\frac{1}{3}$ inferior, globose and pubescent in the upper part, with two 1–8-ovulate chambers (the number greatest in the lower flowers) : styles firmly connate throughout or shortly free, reaching to the anthers.

Caledon Div.: Hottentots Holland Mts. July, *Zeyher* 3475, *Pappe* (June) in S. Afr. Mus. Herb. 36310, *Stokoe* (April) 6033, in Bolus Herb. (Aug.) 17740, in Nat. Herb. Pretoria 2906; Elgin, April, *Compton* 14530; Palmiet River Mts., in swamp, April, *Andreae* 871, *Stokoe* 476; Hanglip, Sept. *Compton* 13518; mountains behind Betty's Bay, Sept. *Leighton* 975; Caledon, Sept. *Grisbrook* in Bolus Herb. 8062; Genadendal 3000 ft. *Schlechter* 9823; Klein River Hills, *Stokoe* 6036.—Ceres Div.: Conical Peak, Dec. *Stokoe* 7624.—Paarl Div.: Du Toit's Kloof, *Drège* in Nat. Herb. Pretoria; Sneeuwkop, *J. C. Smuts* in Bolus Herb. 23050, *Thorne* (Nov.) in S. Afr. Mus. Herb. 46529, *Esterhuysen* (May) 8644 (4500 ft. Dec.) 12462, in Bolus Herb. 23049; Seven Sisters, *Stokoe* in S. Afr. Mus. Herb. 54182; Winterberg, swamp, 5000 ft. Dec. *Esterhuysen* 9660; Witteberg, 6000 ft. Nov. Febr. *Esterhuysen* 8666, 9493, *Wasserfall* 630; Zuurvlakte, Sept. *Primos* in Marl. Herb. 11666; Pic Blanc, swamp, 3000–4000 ft. Jan. *Esterhuysen* 8533.—Robertson Div.: Omklaar, *Stokoe* 6034.—Tulbagh Div.: near Laaken Vlei, c. 4500 ft. Nov. *Phillips* 2025.—Worcester Div.: Wildepaardeberg, Oct. *Stokoe* 6037; Fonteintjiesberg, swamp, 5500 ft. Nov. *Esterhuysen* 10980; Slanghoek Mts., Krom River Peak, c. 4000 ft. Sept. *Adamson* 3623; Hex River Mts., Sentinel, swamp, 5500 ft. Dec.; *Esterhuysen* 8934; *Shale Peaks*, swamp, 5000 ft. Dec. *Esterhuysen* 8487; Matroosberg, *Stokoe* 6035.

The habit of growth varies considerably; at lower altitudes it is rather slender and virgate; at higher altitudes it is much stouter and more closely branched. There is also considerable difference in the size and shape of the leaves. All these differences are linked by intermediate forms.

2. **L. pentandrum** *Pillans* comb. nov. **Passerina pentandra** *Thunb. Prodr.* 76 (1794); *Pers. Syn. Pl.* i, 437 (1805); *Thunb. Fl. Cap.* ed. Schultes 378 (1823). **Gnidia pentandra** *Thunb. Diss. Fruct.* Sect. Pr. 19 (1801). **Lonchostoma obtusiflorum** *Wikstr. in Vet. Acad. Handl. Stockholm* 352, tab. 10, fig. 2 (1818); *Spreng. Syst. Veg.* i, 863 (1825); *DC. Prodr.* xiii, §1, p. 581 (1852); *Sond. in Harv. & Sond. Fl. Cap.* ii, 316 (1861-62); *Dümmer in Journ. Bot.* l, suppl. 2, p. 33 (1912). **Stilbe myrtifolia** *Poir. in Lam. Encycl.* v, 252 (1817); *Lam. Ill.* v, tab. 856, fig. 4 (1823).

Usually 40—60 cm. high, moderately branched. Branchlets villous. Leaves mostly about 8 mm. long, erect-spreading, obovate or ovate, acute, villous beneath, flat or slightly concave and glabrous above, often becoming quite glabrous, 3-veined. Flowers in the axils of reduced leaves, crowded in rotund or elliptic inflorescences 1·5—2·5 cm. long. Bracteoles about 3 mm. long, lanceolate, navicular, pubescent on the upper half of the dorsal face, ciliate. Calyx-tube obconic, adhering to the ovary

throughout : calyx-lobes closely clasping the base of the corolla, about 3 mm. long, ovate or lanceolate, minutely pubescent on the outer face, ciliate. Corolla about 1·5 cm. long, glabrous : petals connate (often lightly) ½ or less of their length in a cylindric tube ; lamina ovate, obtuse or subacute, cream-coloured, with a cuneate-oblong basal claw. Stamens inserted at the mouth of the tube : anthers about 1·25 mm. long, sagittate, glabrous. Ovary ⅓ inferior, globose, villous, bilocular, with 8—12 ovules in each chamber : styles free, reaching to the middle of the tube ; stigmas globose.

Ceres Div.: Witzenberg Vlakte Nek, Oct. *Compton* 11980; south end of Witzenberg Vlakte, swamp, Nov. *Leighton* 500 ; Skurfdeberg Vlakte, Dec. *Lewis* in S. Afr. Mus. Herb. 56804 ; mountains near Klein Vlei, 5500 ft. Jan. *Schlechter* 10057.—Clanwilliam Div. : Cederberg, 4000–5000 ft. Oct. *Thode* A 2059 ; Elands Kloof, swamp, Oct. *Esterhuysen* 3376, *Compton* (Sept.) 10025, 16172.

3. **L. myrtoides** *Pillans* comb. nov. **Ptyxostoma myrtoides** *Vahl in Danske Nat. Selsk. Skriv.* vi, 97 (1810). **Lonchostoma acutiflorum** *Wikstr. in Vet. Acad. Stockholm* (1818) 353, tab. 10, fig. 1 ; *Spreng. Syst. Veg.* i, 863 (1825) ; *DC. Prodr.* xiii, § 1, p. 580 (1852) ; *Sond. in Harv. & Sond. Fl. Cap.* ii, 317 (1861–62) ; *Dümmer in Journ. Bot.* L, suppl. 2, p. 34 (1912).

About 60 cm. high, moderately and often virgately branched. Branchlets villous. Leaves mostly 1—1·3 cm. long, erect-spreading, ovate (the upper often narrowly ovate), acute, sparsely villous beneath, flat or slightly concave and glabrous above, ciliate, becoming glabrous. Flowers in the axils of reduced leaves, crowded in globose or hemispheric inflorescences usually about 2 cm. wide. Bracteoles about 9 mm. long, linear-oblanceolate, acute, navicular, villous on the back, ciliate. Calyx-tube obconic : calyx-lobes 3—3·5 mm. long, oblong-lanceolate, acute, villous on the back, ciliate. Corolla 1·2—1·3 cm. long, glabrous : petals connate slightly less than ⅔ in a cylindric tube ; the free part consisting of a cuneate-oblong claw widening into an ovate or abovate acute lamina. Stamens inserted at the mouth of the tube : filaments about 2·5 mm. long : anthers about 2 mm. long, narrowly sagittate. Ovary ⅓ inferior, bilocular, 8–12-ovulate, broadly elliptic in the superior portion : styles slender, free, reaching to well above the free part of the petals ; stigmas minute.

Ceres Div. : mountains near Ceres, near water, Sept. *Marloth* 6154 ; Michell's Pass Area, Mostert's Hoek Mt., swamp, 2700 ft. Oct. *F. Guthrie* in Guthrie Herb. 3233 ; Die Vlakte, Oct. *Compton* 11988 ; Skurfdeberg Pass, swamp, *Compton* 16225; Witzenberg Vlakte, swamp, Nov. *Leighton* 501, *Lewis* (Dec.) in S. Afr. Mus. Herb. 56803.

4. **L. purpureum** sp. nov.; ramulis villosis; foliis obovatis vel oblanceolatis, subtus convexis villosisque, demum glabris; floribus axillaribus sessilibus; bracteis oblongo-oblanceolatis navicularibus villosis; calyce libero; sepalis ovato-deltoideis ciliatis; petalis obovatis glabris ad basin linearibus connatisque; staminibus marginibus petalis connatis; antheris oblongis; ovario obovato-oblongo, superne villoso, imperfecte biloculari; loculis uni- vel biovulatis; stylis liberis.

Usually 60—90 cm. high, much branched. Branchlets villous. Leaves mostly 6—7 mm. long, erect-spreading or ascending, obovate or oblanceolate, subacute, obtuse or acute, rounded-convex and villous beneath, becoming glabrous, deeply concave and glabrous above. Flowers in the axils of very slightly reduced leaves, in rotund inflorescences about 1 cm. wide. Bracteoles 2·5 mm. long, oblong-lanceolate, subacute, navicular, villous and minutely ciliate on the upper half of the dorsal face. Calyx 3—3·5 mm. long, entirely free from the ovary: tube about 2 mm. long: calyx-lobes ovate-deltoid, subacute or obtuse, ciliate, glabrous elsewhere. Corolla about 9 mm. long, glabrous, purple: petals connate in a tube 1—2 mm. long (occasionally apparently free); the free portion linear in the lower half, thence gradually widening into an obovate obtuse lamina. Stamens adnate to the lower margins of the petals, reaching to shortly above the middle: anthers 1·5 mm. long, oblong: thecae free in the lower half. Ovary entirely superior, obovate-oblong, glabrous on the lower half, villous on the upper, imperfectly bilocular, with 1 or 2 ovules in each chamber: styles free, very slender, reaching to the anthers. Fruit obovate, apparently 2-seeded, dehiscent.

Caledon Div.: Sneeuwkop and Landdrost Kop, 3500–5000 ft., July—Dec. *Esterhuysen* 2617, *Stokoe* 3760, 6018, 8903, in S. Afr. Mus. Herb. 53953; Hottentots Holland Mts., *Stokoe* 6019, in Bolus Herb. 17279, in Nat. Herb. Pretoria 20584, *Glover* in Bolus Herb. 10753; Kogelberg, Aug. *Stokoe* 970, in S. Afr. Mus. Herb. 27426, 56839; Palmiet River Mts., *Stokoe* in Marl. Herb. 11581.—Paarl Div.: Upper Wellington Sneeuwkop, 6000 ft., *Esterhuysen* 12809.—Stellenbosch Div.: Triplets, south slopes, 4000 ft., Dec., *Esterhuysen* 8253, 9163, 12504.

The affinity is with *L. myrtoides* from which it differs in the calyx-lobes being more united and the petals less united. In this and other species of the genus Lonchostoma the ovary is incompletely bilocular; the loculi being incompletely closed on the adaxial face. This is best seen on separating the loculi.

### Imperfectly-known Species.

**L. elegans** *Schltr. in Engl. Bot. Jahrb.* liii, 319 (1915). **Brunia elegans** *Dum. de Cours. Bot. Cult.* iii, 616 (1802).

Schlecter saw a plant named *Brunia elegans*, from the collection of Link and Otto, in the Berlin Herbarium. It was without flowers, but because of the leaf-characters he placed it in the genus *Lonchostoma*, keeping the trivial name, as he believed the plant agreed with the description published by Dumont de Courset.

V. PSEUDOBAECKEA *Nieden. in Engl. & Prantl. Pflanzenfam.* iii, 2a, 136 (1891); *Colozza in Ann. Bot. di Roma* ii, 36 (1905); *Dümmer in Journ. Bot.* L, suppl. 2, p. 22 (1912) partim; *Thonner, Gen. Fl. Pl. Afr.* 237 (1915); *Marl., Fl. S. Afr.* ii, § 1, p. 37 (1925); *Phillips, Gen. S. Afr. Fl. Pl.* 291 (1926); *Levyns, Guide to Fl. of Cape Peninsula* 139 (1929). **Baeckea.** *Burm. f. Prodr.* 12 (1768) non Linn. **Beckea.** *Ecklon & Zeyher, Enum.* Pl. 139 (1835) non Pers. nec St. Hilaire.

Much branched shrubs or undershrubs. Leaves sessile or ± petiolate, imbricate or almost so, linear, lanceolate, ovate or cordate, convex beneath or flat, scabridous or smooth, villous on one or both faces, partly pubescent or ciliate. Stipules absent. Flowers sessile, subtended by a modified leaf or bract and 2 or 3 bracteoles, axillary and solitary, in axillary cymes or in spikes grouped in panicles. Calyx-tube obconic, scabrid, glabrous, somewhat dorsally compressed, adhering to the ovary except for the shallow upper part, ± tubercled, constricted at and articulated with the upper cup-shaped portion: calyx-lobes ovate, oblong or rotund, glabrous or sparsely ciliate. Petals free or very rarely shortly connate, obovate, glabrous, bicarinate near the base. Stamens included: anthers rotund: thecae free in the lower half. Ovary $\frac{1}{3}$—$\frac{3}{4}$ inferior, pubescent or villous, with 1 or 2 uni- or biovulate chambers: styles 2 or very rarely solitary, included, slender, free or shortly connate: stigmas minute. Fruit imperfectly known, globose, tubercled, 1-seeded.

Name from the Greek *pseudos*, false and the genus *Baeckea Burm. f.*

KEY TO THE SPECIES.

Leaves closely appressed to the stem .. .. .. .. .. (4) *teres*
Leaves not closely appressed:
  Leaves linear or almost acicular .. .. .. .. .. (3) *africana*
  Leaves cordate, ovate or lanceolate:
    Bracteoles oblong; calyx-lobes with the free part at least twice as long as the united part .. .. .. .. .. (1) *cordata*
    Bracteoles obovate; calyx-lobes with the free part about equal in length to the united part .. .. .. .. .. (2) *Stokoei*

1. **P. cordata** *Nieden. in Engl & Prantl, Pflanzenfam.* iii, 2a, 136 (1891); *Dümmer in Journ. Bot.* L, suppl. 2, p. 24 (1912) incl. var. **Baeckea cordata** *Burm. f. Prodr.* 12 (1768). **Phylica racemosa** *Linn Mant. altera* 209 (1771); ej. *Syst. Veg.* ed. 13, p. 196 (1774); ed. 14, p. 235 (1784); *Thunb. Prodr. Cap.* 45 (1794); *Lam. Illustr. Gen.* ii, 78 (1797);

*Linn Syst. Veg.* ed. 15, p. 246 (1797); *Willd. Sp. Pl.* i, pars 2, p. 1112 (1798); *Lam. Encycl. Bot.* v, 293 (1804); *Pers. Syn. Pl.* i, 245 (1805); *Thunb. Fl. Cap.* ed. Schultes 202 (1823); *DC. Prodr.* ii, 37 (1825); *Spreng. Syst. Veg.* i, 829 (1825); *Richter, Sp. Pl.* 202 (1840). **Phylica imbricata** *Thunb. Prodr. Cap.* 45 (1794); *Willd. Sp. Pl.* i, pars 2, p. 1112 (1798); *Spreng. Syst. Veg.* i, 828 (1825); *Pers. Syn. Pl.* i, 245 (1805); *Thunb. Fl. Cap.* ed. Schultes 202 (1823); *DC. Prodr.* ii, 37 (1825). **Brunia racemosa** *Brongn. in Ann. Sc. Nat.* viii, 374 (1826); *Sond. in Harv. & Sond. Fl. Cap.* ii, 315 (1861-62). **Brunia imbricata** *Sweet, Hort. Brit.* ed. 2, p. 115 (1830). **Beckea cordata, racemosa** *Ecklon & Zeyher, Enum. Pl.* 140 (1835)! absque descr. **Beckea lancifolia** *E. & Z.* l.c! **Brunia lancifolia** *Walp. Rep.* i, 544 (1842). **Brunia cordata** *Walp.* l.c.; *Sond. in Harv. & Sond. Fl. Cap.* ii, 314. **Brunia laurifolia** *Sond.* op. cit. 315, in syn. **Pseudobaeckea racemosa** *Nieden.* l.c.; *Colozza in Ann. Bot. di Roma.* ii, pp. 20, 36 (1905); *Dümmer in Journ. Bot.* L, suppl. 2 p. 24 (1912). **P. gracilis** *Dümmer* op. cit. p. 25! **P. thymeleoides** *Schltr. in Engl. Bot Jahrb.* Liii, 318 (1915)!

Usually 1—2 m. high. Branchlets ± villous, pubescent or glabrous. Leaves erect-spreading, occasionally spreading or recurved, mostly 0·5—1 cm. long, subsessile, cordate, ovate or lanceolate, rounded or cuneate at the base, obtuse, subacute or acute, flat or slightly concave above, 1—7 veined, ± villous on one or both faces (more often on the upper face) or glabrous. Flowers in rotund or ovate spikes 2—5 mm. long, grouped in small dense panicles. Bract leaf-like, shorter than the flower. Bracteoles 2, about as long as the calyx-tube, ovate-oblong or oblong, obtuse, keeled on the back, deeply concave on the inner face, ± ciliate. Calyx-tube broadly obconic; calyx-segments 0·5—0·75 mm. long, broadly oblong, rotund or circular, glabrous. Petals about 1·5 mm. long, free, obovate, white, with very short keels converging at the base. Anthers scarcely 0·5 mm. long, reaching to the upper half of the petals. Ovary ⅔ inferior, pubescent at the apex, with 2 uniovulate chambers: styles 2, free or rarely connate at the base, reaching to the middle of the petals. Fruit globose, tubercled, 1-seeded.

Bredasdorp Div.: Elim, 400 ft. *Bolus* 8609, *Schlechter* 9646.—Caledon Div.: without precise locality *Rogers* 29224; Hottentots Holland Mts. Nov. *Stokoe* 7331; Moordenaars Kop, damp south-east slopes, Oct. *Esterhuysen* 9165; Somerset Sneeuwkop, 4000 ft. Nov.–Jan. *Esterhuysen* 2615, 2616, *Stokoe* 8906, in S. Afr. Mus. Herb. 56833; between Somerset Sneeuwkop and Landdrost Kop, *Stokoe* 8911, in S. Afr. Mus. Herb. 56834; Landdrost Kop, *Thorne* in S. Afr. Mus. Herb. 49929; ravine between Stettynsberg and Louwshoek Peak, 3000 ft. Dec. *Esterhuysen* 11051; between Steenbras and Hanglip, 4000 ft.

*Stokoe* in Bolus Herb. 17120 ; near Grietjes Gat, edges of streams, Sept. *Ecklon & Zeyher* 1072 ; Kogelberg, Nov. *Stokoe* in S. Afr. Mus. Herb. 56386 ; Swartberg, Oct. *Alexander* in S. Afr. Mus. Herb. sub 36275 ; Klein River Mts., south-east slopes, Sept. *Esterhuysen* 2896 ; Zonder Einde Mts. 2000–3000 ft. *Barnard* 480.—George Div. : Post Berg, Burchell 5957 ; Cradock Peak, Jan. *Stokoe* in S. Afr. Mus. Herb. 54733.—Humansdorp Div. : Humansdorp, *Kennedy* 215, in Bolus Herb. 1110 ; Kromme River, May, *Drège* 6856.—Knysna Div. : Hoogeberg, 4500 ft. Dec. *Keet* 1068 ; Spitzkop, 2500 ft. Dec. *J. Phillips* 29 ; Formosa Peak, Jan. *Stokoe* 7426 ; Concordia Plantation, Dec. *Forest Dept.* Herb. 2718.—Paarl Div. : Du Toit's Kloof, *Drège* 6853 ; Witte River Valley, Nov. *Thorne* in S. Afr. Mus. Herb. 46531 ; French Hoek Mts. 2300 ft. Nov. *Schlechter* 9288 ; Banhoek Mts., in swamp, Dec. Jan. *Stokoe* in Bolus Herb. 16894, in Marloth Herb. 10043, *Esterhuysen* (Sept.) 12285 ; Wemmershoek Peak, Jan. *Stokoe* 9131.—Port Elizabeth Div. : Sand River Reservoir, Oct. *Holland* 3662.—Stellenbosch Div. : Helderberg, rock-crevices, Nov. *Stokoe* 7427, in Marloth Herb. 10721.—Swellendam Div. : Grootvadersbosch, Oct. *Zeyher* 2226 ; Puspas Vlei, *Ecklon & Zeyher* 1070 ; near Zuurbraak, 3200 ft. Jan. *Schlechter* 2099 ; Leeuw River Mts., damp slopes, *Stokoe* 8266, in S. Afr. Mus. Herb. 56835.—Uitenhage Div. : Van Stadens Gorge, Nov. *Long* 222.—Uniondale Div. : Helpmekaar Peak, 4000 ft. *Compton* 897, *Esterhuysen* (Jan.) 4603 ; Witte Els Berg, eastern spur, 3800 ft. Dec. *Fourcade* 3210 ; Blaauwbosch Berg, east ridge, 4100 ft. Nov. *Fourcade* 2829 ; Kouga Mts., near Smutsberg, damp soil, 3000–5000 ft. Nov. *Esterhuysen* 10729, 10730 ; Lauterwater, Jan. *Stokoe* in S. Afr. Mus. Herb. 56837.—Worcester Div. : Hex River Mts. *Ecklon & Zeyher* 1071.

**Var.** $\beta$, **monostyla.** var. nov. ; leaves varying in shape from lanceolate with involute margins to ovate with a flat lamina, $\pm$ villous on the margins or on one or both surfaces. Petals occasionally shortly connate. Ovary with 1 uniovulate chamber : style solitary.

Ceres Div. : Baviaansberg, *Stokoe* 6005 ; Skilderberg, Dec. *Stokoe* 6004.—Clanwilliam Div. : Warm Baths, Sept. 1912, *Edwards* in Bolus Herb. 16156 (type).—Paarl Div. : Kloof leading to Haalspitzkop, 3000 ft. Oct. *Stokoe* 1302.

This species exhibits remarkable variation in the size and shape of the leaves. Except in the variety, the flowers do not appear to possess any characters by which plants with differently shaped leaves can be satisfactorily separated into varieties, much less into species. Those which seem distinct are linked by intermediates.

2. **P. Stokoei** sp. nov. ; ramulis villosis ; foliis sessilibus ovatis, supra concavis glabris vel villosis, subtus villosis ; bracteis foliis similibus ;

bracteolis obovatis obtusissimis, supra medium ciliatis ; tubo calyce scabrido ; sepalis late oblongis vel rotundatis glabris ; petalis liberis obovatis obtusissimis ; ovario subinferiore biloculare ; loculis uniovulatis ; stylis duobus, infra medium connatis.

About 60 cm. high, with villous stems and branchlets. Leaves sessile, imbricate, erect-spreading, 5—7 mm. long, ovate, acute, cuneate at the base, concave and glabrous or villous above, convex, somewhat rugose and villous beneath ; the whole rarely almost flat. Flowers considerably overtopped by the leaves, in shortly pedunculate axillary cymes containing 2 or 3 ; the upper flowers solitary. Bract ovate, subacute, concave above, convex beneath, pilose on the margins and upper half of the dorsal surface, reaching to the upper half of the flower. Bracteoles 2, about 1 mm. long, obovate, very obtuse, concave above, convex beneath, ciliate on the upper half. Calyx-tube obconic, scabrid : calyx-lobes scarcely 0·75 mm. long, broadly oblong or rotund, glabrous. Petals 1·75—2 mm. long, free, obovate, very obtuse, cuneate at the base. Anthers 0·5 mm. long, reaching to the upper half of the petals. Ovary almost entirely inferior, hispid at the apex, with 2 uniovulate chambers : styles 2, connate in the lower half or free. Fruit unknown.

Caledon Div. : Klein River Mts. 2000—3500 ft. Aug. Sept. 1920, *Stokoe* in Bolus Herb. 16612, 16886 (type) in S. Afr. Mus. Herb. 28392, in Marloth Herb. 9553 ; above waterfalls beyond Rocklands, *Stokoe* 7458.

The nearest affinity is with *P. cordata* from which it differs by the leaves normally having a more convex lower surface, the calyx-lobes being more united, and by much longer petals.

3. **P. africana** comb. nov. **Baeckea africana** *Burm. f. Prodr.* 12 (1768), **Phylica pinifolia** *Linn. f. Suppl.* 153 (1781) ; *Vahl, Symbol.* iii, 41 (1794) ; *Thunb. Prodr.* 44 (1794) ; *Linn. Syst. Veg.* ed. 15, p. 246 (1797) ; *Lam. Tab. Encycl. Bot.* ii, 77 (1797) ; *Willd. Sp. Pl.* i, pars 2, p. 1110 (1798) ; *Lam. Encyl. Bot.* v, 293 (1804) ; *Pers. Syn. Pl.* i, 245 (1805) ; *Thunb. Fl. Cap.* ed. Schultes 202 (1823) ; *Linn. Syst. Veg.* ed. 16, i, 829 (1825) ; *DC. Prodr.* ii, 37 (1825). **Brunia pinifolia** *Brongn. in Ann. Sc. Nat.* viii, 375, tab. 35, fig. 2 (1826) ; *Sond. in Harv. & Sond. Fl. Cap.* ii, 314 (1861-62) incl. vars. **Beckea africana** *Ecklon & Zeyher, Enum. Pl.* 139 (1835) absque descr. **Beckea thyrophora** *E. & Z.* op. cit. 140. **Phylica thysophora** *Steud. Nomen.* ed. 2, ii, 326 (1841). **Brunia thysophora** *Walp. Rep.* i, 544 (1842). **Linconia tamariscina** *E. Mey. in Drège, Zwei Pfl. Doc.* 199 (1844) ! nomen. **Pseudobaeckea pinifolia** *Nieden. in Engl. & Prantl, Pflanzenfam.* iii, 2a, 136 (1891) ; *Colozza in Ann. Bot. di Roma* ii, pp. 19, 37 (1905) ; *Dümmer in Journ. Bot.* L, suppl. 2, p. 23 (1912) incl. var. ; *Levyns, Guide to Flora of Cape Peninsula* 139 (1929).

Usually 2—3 m. high. Branchlets 3-sided, ± pubescent, becoming

glabrous. Leaves often imbricate, 1—3 ·5 (usually 1 ·5) cm. long, erect-spreading, spreading or occasionally recurved, shortly petiolate, linear or almost acicular, obtuse or acute ± concave above or flat, 1-veined, glabrous or rarely pubescent on the lower half of the upper surface or about the apex. Flowers in short spikes grouped in panicles. Bracts (modified leaves) shorter to slightly longer than the flowers, linear, lanceolate or ovate, acute, concave and villous above. Bracteoles 2 or 3, 1—1 ·5 mm. long, ovate or rotund, keeled or rounded on the back, concave and glabrous or partly villous on the ventral surface, ciliate. Calyx-lobes 0 ·5—1 mm. long, ovate or rotund, glabrous or sparsely ciliate. Petals 1 ·5 mm. long, free, very obtuse, with keels converging at the base. Anthers 0 ·25 or scarcely 0 ·5 mm. long. Ovary $\frac{2}{3}$ inferior, villous at the apex, with 2 biovulate chambers : styles 2, free or connate at the base. Fruit unknown.

Caledon Div. : Somerset Sneeuwkop, 4000 ft. Oct. Dec. *Esterhuysen* 8275, *Stokoe* 7036 ; Louwshoek Peak, near stream on west slope, 3000 ft. Dec. *Esterhuysen* 11169 ; mountain slopes near Palmiet River, Sept. *Ecklon & Zeyher* 1068, *Stokoe* (Aug.) 986 ; Kloof near Betty's Bay, Sept. *Leighton* 958 ; Kogelberg, Sept. *Stokoe* in S. Afr. Mus. Herb. 56816 ; Hanglip, gorge, Sept. *Compton* 13538 ; mountains at Hermanus, Dec. *Taylor* 1514 ; Kleinmond, edge of stream, 200 ft. Sept. *Compton* 3437 ; French Hoek Pass, east side, *Thorne* in S. Afr. Mus. Herb. 52496.—Cape Div. : Orange Kloof, near stream, Nov. *Marloth* 1773b, 2751 ; Disa Gorge, 1900 ft. *Marloth* 2748, *Compton* in Bolus Herb. 17336.—Ceres Div. : Michell's Pass, *Compton* 11931.—Clanwilliam Div. : near the Olifant's River, damp soil, Oct. *Ecklon & Zeyher* 1069 ; Elands Kloof, river-bank, Oct. *Compton* 9677, *Esterhuysen* 3375.—Paarl Div. : Du Toit's Kloof, 3000—4000 ft. *Drège* in Nat. Herb. Pretoria 9590, in S. Afr. Mus. Herb. 37687 ; Zuurvlakte, north side of Du Toit's Kloof, edge of stream, 2000—3000 ft. Dec. *Esterhuysen* 12326, *Primos* (Sept.) in Marloth Herb. 11665 ; Bain's Kloof Area, Baviaans Kloof, edge of stream, Oct. *Leighton* 1346 ; mountains near French Hoek, *Schlechter* 9346, *Stokoe* in S. Afr. Mus. Herb. 25294.—Piquetberg Div. : mountains near Porterville, Nov. *Edwards* in Bolus Herb. 16154.—Tulbagh Div. : edge of stream above Tulbagh Waterfall, c. 1500 ft. Nov. *Bolus* 5048, *Hutchinson* 422.

4. **P. teres** *Dümmer in Journ. Bot.* L, suppl. 2, p. 26 (1912). **Brunia teres** *Oliver in Journ. Linn. Soc. Bot.* ix, 333 (1867) !

Probably about 50 cm. high, slender, with very slender densely tomentose branchlets. Leaves 1 ·5 mm. long, sessile, closely appressed, imbricate, ovate, acute, with a deciduous apiculus, deeply concave above, convex and scabrid beneath, closely and shortly ciliate, ustulate at the

apex. Stipules absent. Flowers axillary, solitary, sessile, exceeding the leaves. Calyx-tube glabrous. Ovary $\frac{1}{3}$—$\frac{1}{2}$ interior, with 2 biovulate chambers : styles 2, free.

Caledon Div. : Genadendal, upper part of the mountain above Baviaans Kloof, Febr. 1815, *Burchell* 7700 (type, in Kew Herbarium).

This may be a species of *Raspalia*. The present description of the floral parts is based on descriptions published by Oliver and Dümmer.

VI. THAMNEA *Soland.* [*ex R. Br. in Abel, Narr. Journ.* 374 (1818) nomen] *ex Brongn. in Ann. Sc. Nat.* viii, 386, tab. 38 (1826) ; *Reichb. Consp.* 160, no. 4229 (1828) ; *G. Don, Gen. Syst.* ii, 49 (1832) ; *Spach, Veg. Phan.* ii, 476 (1834) ; *Meissn. Gen.* 72 (1837) ; *Endl. Gen.* 807, no. 4604 (1839) ; *Sond. in Harv. & Sond. Fl. Cap.* ii, 324 (1861–62) ; *Benth. & Hook. f. Gen. Pl.* i, 671 (1865) ; *Oliv. in Journ. Linn. Soc. Bot.* ix, 331 (1867) ; *Harv. Gen. S. Afr. Pl.* ed. 2, p. 104 (1868) ; *Nieden. in Engl. & Prantl, Pflanzenfam.* iii, 2a, 134 (1891) ; *O. Kuntze, Rev. Gen. Pl.* i, 234 (1891) ; *Thonner, Blutenpfl. Afr.* 253 (1908); *Dümmer in Journ. Bot.* L, suppl. 2, p. 17 (1912) ; *Thonner, Fl. Pl. Afr.* 236 (1915) ; *Marloth, Fl. S. Afr.* ii, § 1, pp. 36, 39 (1925); *Phillips, Gen. S. Afr. Fl. Pl.* 289 (1926); *Nieden. & Harms in Engl. Pflanzenfam. Aufl.* 2, xviii *a*, 297 (1930). **Schinzafra** *O. Kuntze l.c.*

Much branched slender undershrubs with ascending or rarely decumbent branches. Leaves ± imbricate, appressed at the base or throughout, sessile, ovate, deltoid or lanceolate, trigonous, scabridous, glabrous or ciliate. Stipules absent. Flowers terminal, solitary, sessile or stipitate, subtended by many involucral leaves. Bracteoles absent. Calyx-tube obconic, smooth or longitudinally sulcate, glabrous or sparsely hispid, adhering to the ovary throughout : calyx-lobes valvate or imbricate, oblong or lanceolate, scarious. Petals free, consisting of an oblong or linear bicarinate claw widening into an ovate or obovate lamina, glabrous. Stamens shortly exserted or almost so : anthers linear or lanceolate : thecae free in the basal third. Ovary completely inferior, unilocular and containing 4—8 ovules, or bilocular (often incompletely) and with 2—5 ovules in each chamber, surmounted by a disc with an elevated margin, or capped with a broad style-base : style simple, shortly exserted ; stigmas minute. Fruit (imperfectly known) ellipsoid or cylindric, truncate, longitudinally sulcate, 1-seeded.

Name derived from the Greek *thamnos*, a shrub.

Key to the Species.

Petals exceeding 1 cm. in length :
Leaves subacute ; petals with an ovate lamina ; ovary glabrous .. .. .. .. .. .. .. (1) *diosmoides*

Leaves obtuse or truncate ; petals with an obovate lamina ; ovary with appressed hairs on the upper half .. .. (2) *Massoniana*
Petals less than 1 cm. in length :
Stylar column scarcely half as long as the petals .. .. (4) *thesioides*
Stylar column more than half as long as the petals :
Leaves on the upper parts of the branchlets as well as the involucral leaves pilose-ciliate .. .. .. .. (3) *hirtella*
Leaves glabrous :
Leaves ovate-deltoid ; ovary hispid .. .. .. (5) *depressa*
Leaves lanceolate ; ovary glabrous :
Ovary containing 4 ovules .. .. .. .. (6) *gracilis*
Ovary containing 8 ovules .. .. .. .. (7) *uniflora*

1. **T. diosmoides** *Oliver in Hook. Ic. Pl.* xxiv, tab. 2314 (1894)! *Dümmer in Journ. Bot.* L, suppl. ii, 18 (1912); *Marl. Fl. S. Afr.* ii, §1, tab. 13, fig. E (1925).

Usually 30—50 cm. high, dense, with glabrous branchlets. Leaves mostly 1·5—1·75 mm. long, erect-spreading, ovate-lanceolate, subacute, ustulate-mucronate, with a wide appressed base, slightly convex above, keeled beneath, glabrous. Flowers sessile. Involucral leaves 3—5 mm. long, ovate-lanceolate, acute, grading into the upper leaves. Calyx-tube longitudinally sulcate, glabrous : calyx-lobes 6—7 mm. long, imbricate, erect, oblong-lanceolate, acute, rounded and scabridous on the dorsal surface, red-brown. Petals usually 1·6—1·7 cm. long, consisting of a linear reddish claw considerably thickened up the middle and widening into an ovate or elliptic-ovate, acute, white lamina about 5 mm. long. Anthers 2—2·75 mm. long, obtuse, reaching to the middle of the lamina. Ovary surmounted by a disc with an elevated margin, bilocular, with 4 or 5 pendulous ovules in each chamber : stylar column reaching to the upper half of the lamina : stigmas 2, scarcely distinct. Fruit about 2·5 mm. long, articulated on a stipe, cylindric, sulcate.

CERES DIV. : Mostert's Berg, Oct. *MacOwan* 3088, *Marloth* 1986 ; Michell's Pass, Oct. *A. Bolus* in Guthrie Herb. 3386 ; Skurfdebergen, east slopes, c. 4500 ft. *Bolus* 7479 ; Wagenbooms River, 4500 ft. *Schlechter* 10700 ; top of Gydouw Pass, *Hafstrom and Acocks* 558.—CLANWILLIAM DIV. : Pakhuisberg, Sept. *Esterhuysen* 8015 ; Charity Hill, rock-crevices, 3500 ft. *Thorne* in S. Afr. Mus. Herb. 52642.—TULBAGH DIV. : rocks above Tulbagh Waterfall, Sept. *Schlechter* 1662.—WORCESTER DIV. : Matroosberg, c. 4500 ft. Oct. *Marloth* 2506 ; Hex River Mts., *Marloth* 8100 ; Waaihoek Mt. west slope, 3000 ft. Sept. *Esterhuysen* 8961.

2. **T. Massoniana** *Dümmer in Journ. Bot.* L, suppl. 2, p. 19 (1912).

Usually 30—40 cm. high, dense, with glabrous branchlets. Leaves mostly 3—4 mm. long, broadly sessile, erect-spreading, slightly incurved above the middle, lanceolate, obtuse or truncate, with a small black apiculus, slightly convex above, convex and keeled beneath, scabridous on the keel and margins, glabrous. Flowers sessile, subtended by lanceo-

late involucral leaves. Calyx-tube clothed on the upper half with firm white appressed hairs : calyx-lobes about 7 mm. long, imbricate at the lower margins, erect, oblong-lanceolate, subacute, rounded-convex and nervose on the dorsal surface, glabrous, red-brown. Petals about 1·6 cm. long, consisting, in equal lengths, of a linear claw widening into an obovate very obtuse white lamina. Stamens reaching to the base of the lamina : filaments strap-shaped : anthers about 2·75 mm. long, obtuse. Ovary bilocular, with 3—5 pendulous ovules in each chamber : stylar column slender, reaching to the base of the lamina : stigmas scarcely distinct. Fruit sessile, about 3 mm. long, ellipsoid, depressed at the summit, with short appressed grey hairs in the sulcae.

Caledon Div. : Somerset Sneeuwkop, 4250 ft. March, *Stokoe* 5003 ; between Somerset Sneeuwkop and Landdrost Kop, *Stokoe* 8910 ; Landdrost Kop, April, *Stokoe* 2853 ; between Somerset Sneeuwkop and Sugar Loaf, Febr. *Stokoe* 8909.—Paarl Div. : Winterberg, west slope, among rocks, 5500 ft. *Esterhuysen* 9638.—Stellenbosch Div. : Jonker's Hoek, Dec. *A. Bolus* in Guthrie Herb. 4952 ; Victoria Peak, cliffs on south side, 4500 ft. *Esterhuysen* 9745.

3. **T. hirtella** *Oliver in Journ. Linn. Soc. Bot.* ix, 332 (1867) ! *Dümmer in Journ. Bot.* l, suppl. 2, p. 18 (1912). **T. uniflora** var. **hirtella** *Oliver in Hook. Ic. Pl.* xi, 9, tab. 1013 (1867–71)! **Schinzafra hirtella** *O. Kuntze. Revis. Gen. Pl.* i, 234 (1891).

Probably 30—40 cm. high, occasionally partly decumbent, with pilose branchlets. Leaves 2—2·5 mm. long, widely appressed at the base, loosely imbricate, somewhat erect-spreading, lanceolate or, near the flowers, ovate-lanceolate, obtuse, apiculate, flat or slightly concave above, bluntly keeled beneath, pilose-ciliate. Flowers stipitate, subtended by thin lanceolate ciliate involucral leaves about 4 mm. long. Calyx-tube sulcate, glabrous : calyx-segments 4 mm. long, oblong-lanceolate, acute, rounded-convex on the dorsal suface, pilose-ciliate on the upper half. Petals 7 mm. long, consisting, in equal lengths, of a linear reddish claw widening into an obovate subacute white lamina. Anthers 1·5 mm. long, obtuse, reaching to the upper half of the lamina. Ovary surmounted by a disc with an elevated margin, imperfectly bilocular, 8-ovulate : stigmas fused in a small head. Fruit unknown.

Tulbagh Div. : Witzenberg, April, *Burchell* 8655 (type in Kew Herb.)

4. **T. thesioides** *Dümmer in Journ. Bot.* l, suppl. 2, p. 18 (1912) !

Usually 10—20 cm. high, dense, with glabrous branchlets. Leaves 1—1·5 mm. long, appressed in the lower half, partly imbricate, erect-spreading above the middle, ovate, obtuse or, at first, acute, minutely apiculate, rather acutely or less often obtusely convex beneath, slightly convex on the upper half above, glabrous. Flowers sessile, subtended

by scale-like involucral leaves about 1·5 mm. long. Calyx-segments oblong-lanceolate with an oblong base, or entirely linear-lanceolate, obtuse, slightly convex on the dorsal surface, glabrous. Petals 1·75—2 mm. long, consisting of a broadly oblong reddish claw and an ovate or obovate subacute white lamina. Anthers 0·5 mm. long, linear-lanceolate, obtuse, reaching to the middle of the petals. Ovary capped with a slightly conical style-base, unilocular, with 4 ovules suspended round a central column: stylar column 0·5—0·7 mm. long. Fruit very shortly cylindric, supported by a disc-like stipe and capped with the disc-like style-base.

CERES DIV.: Michell's Pass, *MacOwan* 2714; mountains near Ceres, 1600 ft. Jan. *Bolus* in Herb. Norm. Austr.-Afr. 1152; Mostert's Berg, 2000 ft. *Schlechter* 419; base of mountains near Ceres, rock-crevices, April, *Bolus* 5490; behind Castle Rock on top of mountain facing Ceres, *Stokoe* 2830.

This species is the only one in which the ovary is capped with a broad style-base.

5. **T. depressa** *Oliver in Journ. Linn. Soc. Bot.* ix, 332 (1867); *in Hook. Ic. Pl.* tab. 1012 (1867-71); *Dümmer in Journ. Bot.* L, suppl. 2, p. 18 (1912). **Schinzafra depressa** *O. Kuntze, Rev. Gen. Pl.* i, 234 (1891).

Usually 20—30 cm. high, with glabrous branchlets. Leaves very small, appressed-imbricate, ovate-deltoid, somewhat obtuse, glabrous, larger and thinner at the base of the flowers. Flowers sessile. Calyx-lobes lanceolate, subacute, glabrous. Petals consisting, in equal lengths, of an oblong bicarinate claw widening into an elliptic-obovate obtuse lamina. Anthers oblong-linear, reaching to the upper half of the lamina. Ovary capped with a disc with an elevated margin, imperfectly bilocular, containing 4 ovules: stylar column stout, reaching to the upper half of the petals. Fruit ellipsoid.

CALEDON DIV.: Genadendal, Baviaan's Kloof, Febr. 1815, *Burchell* 7678. [Not seen by me. The above description is based on the descriptions and figures published by Oliver.]

6. **T. gracilis** *Oliver in Journ. Linn. Soc. Bot.* ix, 332 (1867)! *Colozza in Ann. di Bot. Roma* ii, pp. 27, 31 (1905); *Dümmer in Journ. Bot.* L, suppl. 2, p. 18 (1912). **Schinzafra gracilis** *O. Kuntze, Rev. Gen. Pl.* i, 234 (1891).

About 30 cm. high, with very slender glabrous branchlets. Leaves about 1·5 mm. long, closely appressed, with almost half attached to the stem, ovate-lanceolate, obtuse, minutely apiculate, slightly concave above, acutely convex beneath, glabrous. Flowers sessile, subtended by ovate or elliptic thin involucral leaves. Calyx-lobes 2·25 mm. long, oblong, subacute, glabrous, erect, imbricate at base. Petals about 3·75

mm. long, consisting, in equal lengths, of a linear reddish claw widening into an elliptic-obovate subacute white lamina. Anthers 1 mm. long, reaching to the middle of the lamina. Ovary bilocular, with 2 ovules in each chamber, capped with a disc with an elevated margin : stylar column 2 mm. long, slender : stigmas united in a head. Fruit 1·5 mm. long, ellipsoid.

Swellendam Div. : mountains nearest Swellendam, " on the summit of the craggy peak," Jan. 1815, *Burchell* 7342.

7. **T. uniflora** *Soland. ex Brongn. in Ann. Sc. Nat.* viii, 387, tab. 38. fig. 3 (1826) ; *Schnizlein, Iconograph.* iii, tab. 168, figs. 26, 28 (1843-70); *Sonder in Harv. & Sond. Fl. Cap.* ii, 324 (1861-62) ; *Oliver in Journ. Linn. Soc. Bot.* ix, 331 (1867) ; *Dümmer in Journ. Bot.* L, suppl. 2, p. 18 (1912). **Schinzafra uniflora** *O. Kuntze, Rev. Gen. Pl.* i, 234 (1891).

A slender much branched undershrub. Leaves sessile, closely appressed, imbricate, lanceolate, somewhat obtuse, trigonous, bluntly keeled on the dorsal surface, glabrous. Flowers terminal, solitary, sessile, subtended by slightly enlarged thin involucral leaves. Calyx-tube obconic : calyx-lobes imbricate, lanceolate, bicarinate, scarious, glabrous. Petals glabrous, consisting of an oblong claw widening upwards into an ovate obtuse white lamina. Anthers oblong-linear, reaching to the upper half of the petals. Ovary inferior, capped with a disc with an elevated margin, uni- or bilocular, 8-ovulate : styles connate throughout, reaching to the upper half of the petals : stigmas united. Fruit turbinate-ellipsoid, slightly sulcate, 1-seeded.

Caledon Div. : Sir Lowry's Pass, March, 1815, *Burchell* 8274 [Not seen by me. The present description is based on the descriptions published by Oliver and Sonder and the description and figures published by Brongniart.]

VII. RASPALIA *Brongn. in Ann. Sc. Nat.* viii, 377, tab. 37, fig. 1 (1826); *Benth. & Hook. f. Gen. Pl.* i, 672 (1865); *Nieden. in Engl. & Prantl, Pflanzenfam.* iii, 2a, 135 (1891) ; *Dümmer in Journ. Bot.* L, suppl. 2, p. 19 (1912) partim ; *Thonner, Gen. Fl. Pl. Afr.* 237 (1915) ; *Marloth, Fl. S. Afr.* ii, §1, p. 37 (1925); *Phillips, Gen. S. Afr. Fl. Pl.* 290 (1926). **Berardia** *Brongn.* op cit. 380 partim ; *Meissn. Gen.* 72 (1836–42); *Endl. Gen.* 807, no. 4600 (1839) excl. syn. omn. ; *Sonder in Harv. & Sond. Fl. Cap.* ii, 318 (1861-62) partim. **Raspailia** *Meissn. Gen.* 72 ; *Endl. Gen.* 806, no. 4598 ; *Walpers, Rep.* i, 544 (1842) non J. & C. Presl. **Raspallia** *Arnott in Hooker's Journ. Bot.* iii, 259 (1841).

Much branched shrubs or undershrubs with ascending branches. Leaves imbricate, appressed or ascending, sessile or petiolate, linear, lanceolate, ovate, oblong, elliptic or rotund, convex on the dorsal surface,

trigonous or flat, villous on one or both surfaces, tomentose or pubescent on the ventral surface or glabrous. Stipules absent. Flowers small, subtended by a bract and bracteoles, crowded in round or hemispheric heads. Calyx-tube obconic, glabrous, pubescent or villous, adhering to the ovary except for the upper cup-shaped part: calyx-lobes linear, lanceolate, ovate-oblong, ovate or deltoid, glabrous, ciliate or ± villous on the dorsal surface. Petals free, obovate, elliptic or oblong, glabrous, sparsely pubescent or villous on the dorsal surface, glabrous or sparsely pubescent on the ventral surface, bicarinate or with a transverse ridge near the base. Stamens included or exserted: anthers oblong, elliptic, ovate, rotund or orbicular; thecae free in the lower half. Ovary $\frac{1}{2}$—$\frac{3}{4}$ inferior, pubescent, tomentose or villous, bilocular; loculi 1–4-ovulate: styles 2, adjacent, free or ± connate, included or shortly exserted: stigmas minute. Fruit (imperfectly known) dehiscent, 1- or 2-seeded: seeds elliptic or rotund, smooth.

Named in honour of F. V. Raspail, professor of botany in Paris.

KEY TO THE SPECIES.

Stamens exceeding the petals .. .. .. .. .. (16) *Dregeana*
Stamens not exceeding the petals:
  Leaves glabrous on the ventral (adaxial) surface:
    Leaves mostly widest above the middle .. .. .. (15) *globosa*
    Leaves mostly widest at or below the middle or almost parallel-sided:
      Leaves linear .. .. .. .. .. .. .. (7) *staavioides*
      Leaves wider:
        Leaves glabrous or with a few hairs on the dorsal surface:
          Calyx-tube glabrous; styles reaching to the tips of the petals .. .. .. .. .. .. (9) *oblongifolia*
          Calyx-tube puberulous; styles reaching to the middle of the petals .. .. .. .. .. (8) *Stokoei*
        Leaves with many conspicuous hairs on the dorsal surface:
          Petals 1·25—1·5 mm. long .. .. .. .. (10) *palustris*
          Petals 2 mm. or more in length:
            Leaves bearing straight hairs; petals about 2 mm. long, obovate .. .. .. .. .. (12) *sacculata*
            Leaves bearing bent hairs; petals about 2·75 mm. long, elliptic-ovate .. .. .. .. (11) *Barnardii*
  Leaves ± hairy on the ventral surface:
    Petals linear-oblong or lanceolate-oblong, broad at base .. (14) *phylicoides*
    Petals oblanceolate, obovate or elliptic, narrowing towards the base:
      Leaves erect-spreading, flat or almost so .. .. (13) *villosa*
      Leaves appressed or ascending, if erect-spreading then distinctly concave on the ventral surface:
        Leaves glabrous on the dorsal surface, without cilia:
          Leaves densely tomentose on the ventral surface .. (6) *virgata*
          Leaves not densely tomentose on the ventral surface:
            Leaves 1—1·25 mm. long; petals 1—1·25 mm. long; anthers elliptic .. .. .. .. (5) *trigyna*
            Leaves 1·75—2·5 mm. long; petals about 1·5 mm. long; anthers rotund .. .. (4) *Schlechteri*
        Leaves ± hairy on the dorsal surface (at least when young) or ciliate:

Leaves V-shaped in transverse section; calyx-tube glabrous .. .. .. .. .. .. (2) *angulata*
Leaves U-shaped in transverse section; calyx-tube villous, ± pubescent or becoming glabrous: ..
Leaves rotund, ovate or rarely elliptic, closely appressed throughout their length; petals pubescent on the dorsal surface .. .. (1) *microphylla*
Leaves lanceolate, elliptic or ovate-lanceolate, not appressed throughout their length; petals glabrous or with a few hairs on the upper half of the dorsal surface .. .. .. (3) *variabilis*

1. **R. microphylla** *Brongn. in Ann. Sc. Nat.* viii, 378, tab. 37, fig. 1 (1826); *Dümmer in Journ. Bot.* L, suppl. 2, p. 20 (1912); *Thonner, Gen. Fl. Pl. Afr.* tab. 63 (1915). **Brunia microphylla** *Thunb. Prodr. Pl. Cap.* 187 (1800); ej. *Diss. Brun.* 7 (1804); *Lam. Encycl.* suppl. i, 712 (1810); *Thunb. Fl. Cap.* ed. Schultes 207 (1823); *DC. Prodr.* ii, 44 (1825); *D. Dietr. Syn. Pl.* i, 848 (1839). **Raspailia microphylla** *Walp. Rep.* i, 544 (1842). **Raspalia teres** *E. Mey. in Drège, Zwei Pfl. Doc.* 215 (1844) nomen. **Berardia microphylla** *Sond. in Harv. & Sond. Fl. Cap.* ii, 320 (1861-62). **Nebelia microphylla** *O. Kuntze, Rev. Gen.* pars i, p. 233 (1891).

Usually 60—90 cm. high, with villous branchlets. Leaves mostly 1·5—1·75 mm. long, sessile, closely appressed, at first partly imbricate, rotund, ovate or rarely elliptic, obtuse, apiculate, ciliate, convex and at first sparsely pubescent on the dorsal surface, concave on the ventral surface, villous at the base. Flower-heads mostly 3–4 mm. wide, convex above, subtended by several leaves. Bracts and bracteoles linear, villous on the dorsal surface. Calyx-tube villous, adhering to the ovary except the upper part: calyx-lobes deltoid, apiculate, villous on the dorsal surface. Petals about 1 mm. long, elliptic, villous on the upper half of the dorsal surface, with 2 converging keels on the lower half. Stamens half as long as the petals: anthers rotund. Ovary slightly more than half inferior, villous, with 2 uniovulate chambers: styles about 0·5 mm. long. Fruit 1-seeded; seed elliptic, smooth.

Bredasdorp Div.: upper mountain slopes near Bredasdorp, Dec. *Galpin* 10459, *Hafstrom and Acocks* 2133.—Caledon Div.: Hottentots Holland Mts. Sir Lowry's Pass, June—March, *Salter* 6521, *Schlechter* 5389, *Ecklon & Zeyher* 1073, *Hutchinson* 504, *Stokoe* 203, 7326, *Bolus* 5547, in Herb. Norm. Austr.-Afr. 100, *Thorne* in S. Afr. Mus. Herb. 50411; near Grabouw, *Andreae* 1066; Viljoen's Pass, *Galpin* 12327; Palmiet River Valley, *Stokoe* 8816, 8817; Steenbras Plateau, rock-crevices, *Stokoe* 7430; mountain top near Palmiet River, 2000 ft. *Bond* 1536, *Stokoe* 8265; Nieuweberg, *Stokoe* 3193, 4031, *Compton* (2500 ft.) 6741; between Sugar Loaf and Somerset Sneeuwkop, *Stokoe* 8519. Kogelberg, 3000 ft. Jan. *Compton* 16463, 16871, *Leighton* 760, *Stokoe* (Sept.) 7327, in S. Afr. Mus. Herb. 56829, *Esterhuysen* 9968; Hanglip, Jan. *Compton* 6108,

*Pillans* 8216 ; Babylons Tower, 3000 ft. Febr. *Esterhuysen* 4985 ; Zwartberg, 2000 ft. Oct. *Bodkin* in Bolus Herb. 6905, *Bolus* (2600 ft. Jan.) 7388 ; mountains at Vogelgat, 3000 ft. Dec. *Schlechter* 9563 ; Klein River Mts., east of Rocklands Peak, Sept. *Stokoe* in S. Afr. Mus. Herb. 56830 ; Genadendal, Oct. *Drège* in Nat. Herb. Pretoria 9586, in S. Afr. Mus. Herb. 45031, *Schlechter* 9850, *Galpin* (3500 ft.) 4039 ; Wildepaardeberg, summit, *Stokoe* 1174 ; River Zonder Einde Mts., Oudebosch, 5000 ft. Sept. *Stokoe* 2111, 8914, in S. Afr. Mus. Herb. 56828 ; "The Peak," Oct. *Stokoe* 9242.—Paarl Div. : Du Toit's Peak, ridge on west side, 5000 ft. Dec. *Esterhuysen* 12384, 12385 ; Wellington Sneeuwkop, 4000–5000 ft. *Barnard* 667 ; French Hoek Mts. *Schlechter* 9270.—Swellendam Div. : Paardekop, Jan. *Stokoe* 7431.

The hairs which appear to arise upon the base of the ventral surface of the leaves may, in fact, arise upon a portion of the stem adhering to the leaf.

2. **R. angulata** *Nieden. in Engl. & Prantl, Pflanzenfam.* iii, 2a, 135 (1891) non E. Meyer ; *Dümmer in Journ. Bot.* L, suppl. 2, p. 20 (1912). **Raspailia struthioloides** *Presl, Bot. Bemerk.* 40 (1844) nomen. **Berardia angulata** *Sond. in Harv. & Sond. Fl. Cap.* ii, 320 (1861-62). **Nebelia angulata** *O. Kuntze, Rev. Gen.* i, 233 (1891).

Usually 75—90 cm. high, with villous branchlets. Leaves mostly 2 mm. (rarely up to 7 mm.) long, sessile, appressed or rarely erect-spreading, partly imbricate, ovate, subacute, apiculate, rather acutely convex and at first pilose on the dorsal surface, concave on the ventral surface, pilose at the base, ciliate. Flower-heads mostly about 4 mm. wide, convex above. Bracts villous on the dorsal surface ; the outer leaf-like ; the inner oblanceolate. Bracteoles linear, villous on the dorsal surface. Calyx-tube obconic, glabrous, adhering to the ovary except the upper part : calyx-lobes broad-based, linear-lanceolate, villous on the dorsal surface. Petals about 1·5 mm. long, obovate, obtuse, glabrous, indistinctly keeled on the lower half. Anthers rotund, reaching to about the middle of the petals. Ovary half inferior, pubescent on the top, with 2 uniovulate chambers : styles free. Fruit unknown.

Caledon Div. : Wildepaardeberg, *Stokoe* 2741 ; River Zonder Einde Mts. Oct. *Stokoe* 7432.—Paarl Div. : Wellington Sneeuwkop, 5000–6000 ft. Dec. Jan. *J. C. Smuts* in Bolus Herb. 23039, *Esterhuysen* 12446 ; Du Toit's Peak, Jan. *Marloth* 2497 ; Du Toit's Kloof, Oct. *Drège* 6868 ; Winterberg, rocks on south-east side of the summit, 5500 ft. Dec. *Esterhuysen* 9663 ; Bailey's Peak, 4000–5000 ft. Jan. *Esterhuysen* 8523 ; Haalhoek Spitzkop, summit, 4800 ft. April, *Esterhuysen* 7725 ; Wemmershoek Mts., April Peak, south-east slopes below summit, 5000 ft. Dec. *Esterhuysen* 4104 ; between Bailey's Peak and Pic Blanc, *Esterhuysen*

1648.—Worcester Div. : Wittebevg, 6000 ft. Nov.–Febr. *Esterhuysen* 8679, 9472, *Wasserfall* 636 ; Slanghoek Mts., top of Kromriver Peak, 4600 ft. Sept. *Adamson* 3622, *Esterhuysen* (March) 11525 ; Slanghoek Pile, summit, 5600 ft. Jan. *Esterhuysen* 1718 ; Observation Peak, on rocks, Jan. *Esterhuysen* 1709.

Remarkably luxuriant growth occasionally appears on plants of normal growth producing erect-spreading leaves up to 7 mm. long, less concave on the ventral surface and more pilose on the dorsal surface.

3. **R. variabilis** sp. nov. ; ramulis tomentosis ; foliis sessilibus ovato-lanceolatis vel lanceolatis obtusis, supra concavis villosis, subtus convexis sparsim villosis vel glabris ; floribus terminalibus aggregatis ; bractea foliacea ; tubo calycis pubescente vel glabro ; sepalis lanceolatis subtus villosis ; petalis obovatis vel ellipticis glabris vel subtus sparsim pilosis ; antheris oblongis vel ellipticis ; ovario semi-inferiore, infra medio villoso, biloculare ; loculis uniovulatis ; stylis duobus liberis.

Usually 30—40 cm. high, with tomentose branchlets. Leaves 2—3 mm. long, sessile, partly imbricate, ascending, ovate-lanceolate or lanceolate, obtuse, apiculate ; the dorsal surface rounded-convex or obtusely angled, sparsely villous or glabrous ; the ventral surface deeply concave, mostly villous, or only at the base. Flowers usually in terminal clusters of 3–9, rarely solitary. Bract leaf-like but smaller. Bracteoles about as long as the calyx-tube, narrowly oblanceolate, navicular, villous on the dorsal surface. Calyx-tube ± pubescent, often becoming glabrous, with a free upper part : calyx-lobes lanceolate, apiculate, villous on the dorsal surface. Petals 1·5—2 (rarely 2·5—2·75) mm. long, obovate, elliptic or obovate-elliptic, cuneate at base, glabrous or with a few hairs on the upper half of the dorsal surface, with converging keels near the base. Stamens reaching near or to the tips of the petals : anthers 0·5—1 mm. long, oblong or elliptic. Ovary ½ inferior, villous on the upper part, with 2 uniovulate chambers : styles free, 0·75—1·25 mm. long. Fruit unknown.

Caledon Div. : Somerset Sneeuwkop, 4000 ft., Nov. Dec. *Esterhuysen* 2614, *Stokoe* 6038, 8912, in S. Afr. Mus. Herb. 54154 ; Landdrost Kop, *Stokoe* 7632 ; Kogelberg, Five Beacon Ridge, on rocks, 3500 ft. Jan. *Esterhuysen* 9969 ; Genadendal Mt., Baviaan's Kloof, Oct. *Stokoe* 2533 ; Genadendal Mt., summit, 5000 ft. *Galpin* 4040 ; Wildepaardeberg, 5000 ft. Sept.—Dec. *Stokoe* 1067a, 1067b, 2741, 9220, in Bolus Herb. 17871 ; Zonder Einde Mts., *Barnard* 471 ; peaks on ridge west of Zonder Einde Peak, 4500—5000 ft. Nov. *Thorne* in S. Afr. Mus. Herb. 45751.—Paarl Div. : Wemmershoek Peak, south-west side, on ledges, 5600 ft. Dec. *Esterhuysen* 11345 (type, in Bolus Herb.), 11569, *Stokoe* in S. Afr. Mus. Herb. 56826 ; Wemmershoek Mts., Tafelberg, north-east side,

4500–5000 ft. Oct. *Wasserfall* 563 ; Wemmershoek, near the beacon, 5700 ft. Sept. *Esterhuysen* 11569, *Stokoe* 7405.—Oudtshoorn Div. : Seven Weeks Poort Mts. Dec. *Primos* 57, *Stokoe* 1083, 8913 ; Zwartberg Pass, Dec. *Stokoe* 8815, in S. Afr. Mus. Herb. 56827.—Robertson Div. : Omklaar, *Stokoe* 6040 ; Bosjesveld Mts., 5000 ft. Febr. *Stokoe* in S. Afr. Mus. Herb. 56825.—Stellenbosch Div. : between Somerset Sneeuwkop and Triplets, on rocks, 4000–5000 ft. Oct. *Esterhuysen* 9162 ; Victoria Peak, south-west slopes, on rocks, 3500–4500 ft. Jan. *Esterhuysen* 9744.—Worcester Div. : Du Toit's Peak, 6500 ft. Jan. *Esterhuysen* 8584.

The affinity is with *R. microphylla* Brongn. from which it is distinguished by longer, differently shaped and ascending leaves.

4. **R. Schlechteri** *Dümmer in Journ Bot.* L, suppl. 2, p. 22 (1912)!

About 1·5 m. high, with pubescent upper branches and branchlets. Leaves 1·75—2·25 mm. long, sessile, partly imbricate, appressed, ovate-lanceolate, obtuse, obtusely angular-convex and scabrid on the dorsal surface, pilose on the median vein of the concave ventral surface. Flower-heads about 4 mm. wide. Bract leaf-like but smaller. Bracteoles oblong, deeply concave on the ventral surface, ciliate, scarcely reaching to the middle of the sepals. Calyx-tube pubescent, with a shallow cup-shaped free upper part : calyx-lobes deltoid-ovate, obtuse, glabrous on both surfaces, ciliate, reaching to the middle of the petals. Petals about 1·5 mm. long, obovate, obtuse, glabrous, bicarinate below the middle. Stamens reaching to well above the middle of the petals : anthers rotund. Ovary $\frac{3}{4}$ inferior, pubescent, with 2 biovulate chambers : styles free. Fruit unknown.

Riversdale Div. : Langebergen, 600 ft. Nov. *Schlechter* 1750 ; summit of Langebergen, by rocky streams, 3500–4000 ft. Dec. *Muir* 1265.

Closely related to *R. trigyna* Dümmer but distinguished by much larger leaves and petals, and by glabrous sepals.

5. **R. trigyna** *Dümmer in Journ. Bot.* L, suppl. 2, p. 21 (1912). **Berardia trigyna** *Schltr. in Journ Bot.* xxxvi, 315 (1898); *Wood in Trans. S. Afr. Phil. Soc.* xviii, 155 (1908).

About 2 m. high, with slender minutely pubescent branchlets. Leaves mostly 1—1·25 mm. long, closely set, appressed, sessile, lanceolate, obtuse, apiculate, rather acutely convex on the glabrous dorsal surface, concave and minutely pubescent on the ventral surface, with a tuft of caducous hairs at the apex. Flower-heads about 2·5 mm. wide, solitary, terminal. Bracts accompanying the outer flowers foliaceous ; the inner linear-oblong, ciliate, villous on the dorsal surface. Bracteoles linear-oblong, villous on the dorsal surface. Calyx-tube villous, with a shallow cup-shaped free upper part : calyx-lobes ovate-oblong, sparsely villous on the dorsal surface, ciliate, reaching to shortly above the middle of the

petals. Petals 1—1·25 mm. long, obovate-oblong, obtuse, glabrous, bicarinate on the lower half. Stamens reaching to the tips of the petals ; anthers elliptic. Ovary ¾ inferior, villous, with 2 uni- or biovulate chambers : styles free. Fruit dehiscing downwards, 1- or 2-seeded : seeds rotund, smooth.

Natal : without precise locality, *Dr. Sutherland* ; near Murchison, wet places, 2000 ft. *Wood* 3029.—Pondoland : Umkwani River, rocky places near the sea, Oct. *Tyson* 2648 ; Egossa, Aug. Sept. *Sim* 2505.

Schlechter recorded the presence of 3 styles and an ovary with 3 chambers. There may have been some abnormal development in the material he examined. No indication is given as to what collecting was used for the type.

6. **R. virgata** comb. nov. **Brunia virgata** *Brongn. in Ann. Sc. Nat.* viii, 376 (1826); *Sond. in Harv. & Sond. Fl. Cap.* ii, 315 (1861-62) incl. var., excl. syn. Thunb. **Brunia verticillata** *Ecklon & Zeyher, Enum. Pl.* 139 (1835) absque descr., non Thunb. **Pseudobaeckea virgata** *Nieden. in Engl. & Prantl, Pflanzenfam.* iii, 2a, 136 (1891); *Dümmer in Journ. Bot.* L, suppl. 2, p. 23 (1912) ; *Phillips in Fl. Pl. S. Afr.* iv, tab. 150 (1924). **Mniothamnea passerinoides** *Wright in Kew Bull.* 1924, p. 256 !

Usually 50—90 cm. high, with slender tomentose branchlets. Leaves mostly 4—6 mm. long, sessile, appressed, shortly imbricate on the branchlets, lanceolate, apiculate, rounded-convex on the dorsal surface, concave and densely tomentose on the ventral surface. Flower-heads 3—5 mm. long, rotund, conical or spherical, terminal and solitary or several together. Bract leaf-like, ovate, much shorter than the flower. Bracteoles 2, oblanceolate-linear, obtuse, deeply concave on the ventral surface, 1—1·25 mm. long. Calyx-tube dorsally compressed, glabrous, with a shallow cup-shaped free upper part : calyx-lobes about 1 mm. long, unequal in size, oblong-lanceolate, obtuse, glabrous. Petals about 1·25 mm. long, obovate, elliptic or oblong, obtuse, glabrous, whitish, with a pair of short converging keels at the base. Stamens slightly shorter than the petals : filaments recurved above the middle : anthers ovate. Ovary inferior, tomentose on the top, with 2 uniovulate chambers : styles ± connate in the lower half, reaching to about the middle of the petals. Fruit unknown.

Caledon Div. : Hottentots Holland Mts., Sept. *Stokoe* in Bolus Herb. 17741 ; swamp at base of Valleiberg, Oct. *Esterhuysen* 9155 ; Somerset Sneeuwkop, south-east slopes, 4000 ft. Dec. *Esterhuysen* 2613, *Stokoe* 8908 ; Landdrost Kop, *Stokoe* 6045 ; between Landdrost Kop and Valleiberg, swamp, Oct. *Esterhuysen* 9160 ; east of Kogelberg, Jan. *Stokoe* 220 ; Kogelberg, *Lamb* 2978, *Stokoe* 471, 529, 1000, in S. Afr. Mus. Herb. 23777, in Marloth Herb. 11360, in Nat. Herb. Pretoria 2578 ;

Palmiet River Valley, *Stokoe* 6043, in S. Afr. Mus. Herb. 25302 ; Genadendal, Waterkloof, 3750 ft. Oct. *Stokoe* 2484 ; Wildepaardeberg, Oct. *Stokoe* 2484, 2742 ; River Zonder Einde Mts., above the farm " Linde," Sept. *Ecklon & Zeyher* 1066 ; mountains near Appels Kraal, *Zeyher* 2652 ; River Zonder Einde Mts. Oct. *Stokoe* 7433.—RIVERSDALE DIV. : Garcia's Pass, Sept. *Galpin* 4045.—ROBERTSON DIV. : Omklaar, *Stokoe* 6044.—STELLENBOSCH DIV. : the Triplets, 4000 ft. Dec. *Esterhuysen* 8254 ; Victoria Peak, cliffs on south side, 4500 ft. Jan. *Esterhuysen* 9771.—SWELLENDAM DIV. : Puspasvlei, mountains, Oct. *Ecklon & Zeyher* 1065 ; mountains near Swellendam, 3000 ft. Oct. *Galpin* 4046 ; Lemoenshoek Peak, south slope, 4000 ft. Sept. *Esterhuysen* 10476.—UNIONDALE DIV. : Prince Alfred's Pass, Jan. *Stokoe* in S. Afr. Mus. Herb. 56822.

7. **R. staavioides** comb. nov. **Brunia capitellata** *E. Mey. in Drège, Zwei. Pfl. Doc.* 169 (1844) ! nomen, non Thunb. **Raspalia capitella** *Presl, Bot. Bemerk.* 39 (1844) absque. descr. **Brunia staavioides** *Sond. in Harv. & Sond. Fl. Cap.* ii, 316 (1861-62). **Pseudobaeckea capitellata** *Nieden. in Engl. & Prantl, Pflanzenfam.* iii, 2a, 136 (1891).

About 70 cm. high, with puberulous or pubescent red-brown branchlets. Leaves mostly 5—8 mm. long, closely set, petiolate, erect-spreading, spreading or recurved, linear, obtuse, trigonous, glabrous, with a prominent vein on the upper surface. Flower-heads 3—4 mm. wide, hemispheric, often in panicle-like clusters. Bracts accompanying the outer flowers lanceolate, concave on the ventral surface, ciliate. Bracteoles setaceous, villous, reaching to the middle of the calyx-lobes. Calyx-tube villous, with caducous hairs, with a cup-shaped free upper part : calyx-lobes linear-lanceolate, villous on the dorsal surface, reaching to the middle of the petals. Petals about 1·25 mm. long, obovate, glabrous, white, with short keels converging at the base. Stamens reaching to the middle of the petals ; anthers rotund. Ovary $\frac{3}{4}$ inferior, persistently villous on the superior part, with 2 uniovulate chambers : styles united except for the diverging tips. Fruit 1-sceded.

CLANWILLIAM DIV. : Blaauwberg, 3000–5000 ft. Nov. *Drège* in S. Afr. Mus. Herb. 15796, in Nat. Herb. Pretoria 9592 ; Cederberg, *Marloth* 2668 ; Pakhuis, 2000 ft. Aug.–Dec. *Schlechter* 10802, Bond 585, *Leipoldt* 3331, *Esterhuysen* 3378; peak at Koupoort, 5000 ft. Oct. *Esterhuysen* 12138, 12175 ; Krakadouw Pass, Sept. *Thorne* in S. Afr. Mus. Herb. 52497 ; Krakadouw Pk., 5000 ft. Dec. Jan. *Esterhuysen* 7506, *Stokoe* in S. Afr. Mus. Herb. 56817.

8. **R. Stokoei** sp. nov. ; ramulis sparsim villosis ; foliis petiolatis lanceolatis oblongo-lanceolatis vel ellipticis obtusis, subtus convexis pubescentibus ; inflorescentiis capitiformis ; bracteis foliaceis ; bracteolis oblanceolatis, subtus convexis pubescentibus ; tubo calycis compresso

puberulo ; sepalis auguste deltoideis ciliatis, subtus villosis ; petalis obovatis vel ellepticis glabris, basi cuneatis carinatis ; staminibus inclusis ; antheris orbicularibus ; ovario semi-inferiore, apice pubescente biloculare, apice pubescente ; loculis uni- vel biovulatis ; stylis duobus liberis.

About 30 cm. high, with sparsely villous branchlets. Leaves closely set, petiolate, 3—5 mm. long, lanceolate, oblong-lanceolate or elliptic, obtuse, erect-spreading, slightly incurved above the middle, convex and sparsely pubescent on the dorsal surface, flat on the ventral surface, slightly thickened at the margins, with a prominent median vein. Flower-heads solitary, 4—5 mm. wide, rotund or hemispheric. Bracts foliaceous. Bracteoles oblanceolate, acutely convex and pubescent on the dorsal surface, reaching to the base of the sepals. Calyx-tube dorsally compressed, puberulous, with a cup-shaped free upper part : calyx-lobes narrowly deltoid, villous on the dorsal surface, ciliate, reaching to the middle of the petals. Petals about 1·5 mm. long, obovate or elliptic, cuneate at base, obtuse, glabrous, white, with short keels merging at the base. Stamens reaching to the upper half of the petals : anthers orbicular. Ovary about half inferior, pubescent at the apex, with 2 uni- or biovulate chambers : styles free, diverging above the middle, reaching to the middle of the petals. Fruit unknown.

Ceres Div. : Conical Peak, shale band, 6000 ft. Dec. *Stokoe* 7626, in S. Afr. Mus. Herb. 56832.—Tulbagh Div. : Little Winterhoek, 3000 ft. Dec. 1920, *Stokoe* 346 (type, in Bolus Herb.).—Worcester Div. : Hex River Mts., shale peaks, 6000 ft. Dec. *Esterhuysen* 8457.

This species and *R. oblongifolia*, the species following next, are distinguished from all others by their leaf-characters.

9. **R. oblongifolia** sp. nov. ; ramulis villosis ; foliis petiolatis oblongis obtusis, supra paulum concavis glabris, subtus convexis sparsim pilosis ; inflorescentiis capitiformibus ; bracteis lanceolatis ciliatis ; bracteolis oblanceolatis, subtus sensim convexis villosis ; tubo calycis sulcato glabro ; sepalis lanceolatis ciliatis ; petalis ellipticis obtusis glabris basi cuneatis ; staminibus inclusis ; antheris ellipticis ; ovario pro parte multo inferiore biloculare, supra villoso ; loculis uniovulatis.

About 30 cm. high, with villous branchlets. Leaves closely set, about 4 mm. long, petiolate, erect-spreading, slightly incurved, oblong, obtuse, convex and, at first, sparsely pilose on the dorsal surface, slightly concave and glabrous on the ventral surface, at first ciliate. Flower-heads about 6 mm. wide, rotund or hemispheric. Bracts of the inner flowers lanceolate, ciliate. Bracteoles oblanceolate, sharply convex and villous on the dorsal surface, reaching to the middle of the sepals. Calyx-tube fluted, glabrous, adhering to the ovary except for a shallow cup-shaped upper part : calyx-lobes lanceolate, ciliate, reaching to the middle of the petals.

Petals about 2·25 mm. long, elliptic, cuneate at the base, obtuse, glabrous, white. Stamens reaching almost to the tips of the petals: anthers elliptic, apiculate. Ovary ¾ inferior, densely villous on the upper part, with 2 uniovulate chambers: styles free, reaching to or shortly above the tips of the petals. Fruit unknown.

Worcester Div.: Waaihoek Mts. among rocks, 5500 ft. Dec. 1942, *Esterhuysen* 8321 (in Bolus Herb.).

The affinity is with *R. Stokoei* from which it is distinguished by the glabrous calyx-tube and longer styles.

10. **R. palustris** comb. nov. **Brunia palustris** *Schltr. ex Kirchner, Beitr. Kennt. Brun. Breslau* 15 (1904)! **Pseudobaeckea palustris** *Dümmer in Journ. Bot.* L, suppl. 2, p. 26 (1912).

About 1·5 m. high, with villous upper branches and branchlets. Leaves sessile, closely set, about 4 mm. long, erect-spreading, lanceolate or linear-lanceolate, subacute, narrowed towards the base, villous on the dorsal surface, slightly concave and glabrous on the ventral surface. Flower-heads 3—4 mm. wide, solitary, spherical or rotund: flowers occasionally axillary. Bract ovate, villous on the dorsal surface, deeply concave and glabrous on the ventral surface. Calyx-tube villous, with a shallow cup-shaped upper part: calyx-lobes lanceolate, villous on the dorsal surface, reaching to the middle of the petals. Petals 1·25—1·5 mm. long, oblong-obovate or elliptic, obtuse, cuneate at the base, glabrous, with short keels merging in a basal thickening. Stamens reaching to the upper half of the petals: anthers scarcely 0·5 mm. long, rotund. Ovary ¾ inferior, villous on the upper part, with 2 readily separable uniovulate chambers: styles free. Fruit 1-seeded.

Ceres Div.: Koude Bokkeveld, mountains at Klein Vlei, 5500 ft. *Schlechter* 10055; near Wagenbooms River, Skurfdebergen, 5000 ft. *Schlechter* 10153; Schoongezicht Peak, 5800 ft. April, *Stokoe* 7429, in S. Afr. Mus. Herb. 54204; near Gideon's Kop, Nov. *Stokoe* in S. Afr. Mus. Herb. 56824.—Clanwilliam Div.: Krakadouw Peak, Jan. *Stokoe* in S. Afr. Mus. Herb. 56823.—Paarl Div.: Wellington Sneeuwkop, 4700 ft. Nov. *Adamson* in S. Afr. Mus. Herb. 36862.—Robertson Div.: Omklaar, *Stokoe* 6042.—Tulbagh Div.: Sneeuwgat Valley, 3500–5000 ft. Nov. *Thorne* in S. Afr. Mus. Herb. 50389.—Worcester Div.: Wilde Paardeberg, *Stokoe* in Nat. Herb. Pretoria 15881.

Closely related to *R. villosa* Presl of which it may be a variety. It is now distinguished as a species by the sepals being villous on the dorsal surface and by the slightly larger anthers. The structure and texture of the ovary indicate that this species belongs to *Raspalia*.

11. **R. Barnardii** sp. nov.; ramulis villosis; foliis dense imbricatis sessilibus auguste oblongo-lanceolatis, supra paulum concavis glabris,

subtus convexis villosis ; capitulis hemisphaericis ; bractea oblongo-lanceolata, dorso villosa ; bracteolis linearibus dorso villosis ; tubo calycis pubescente ; sepalis linearibus villosis ; petalis elliptico-ovatis obtusissimis glabris ; staminibus inclusis ; filamentis basin versus crassis ; ovario biloculare pro parte majore inferiore, supra medium villoso ; loculis uniovulatis ; stylis liberis.

About 30 cm. high. Branchlets villous with bent hairs. Leaves very closely set, ascending, slightly incurved, sessile, 6—7 mm. long, narrowly oblong-lanceolate, subacute, apiculate, convex and villous with bent hairs on the dorsal surface, slightly concave and glabrous on the ventral surface. Flower-heads 5—7 mm. wide, hemispheric. Bract almost as long as the flower, oblong-lanceolate, villous on the dorsal surface, deeply concave and glabrous on the ventral surface. Bracteoles 2, linear, about half as long as the flower, villous on the dorsal surface. Calyx-tube pubescent, adhering to the ovary except for a shallow upper part : calyx-lobes linear, villous, reaching to well above the middle of the petals. Petals about 2·75 mm. long, elliptic-ovate,very obtuse, glabrous. Stamens reaching to the middle of the petals : filaments incurved, with a very prominent knee-shaped thickening near the base ; anthers scarcely 0·75 mm. long, elliptic. Ovary more than half-inferior, villous on the upper part, with 2 uniovulate chambers : styles free, about 1·25 mm. long. Fruit unknown.

Swellendam Div. : mountains near Swellendam, 4000 ft. Oct. 1925, *Barnard* in S. Afr. Mus. Herb. 28912 (type).

The affinity is with *R. sacculata* from which it can be distinguished by the bent hairs on the branchlets and leaves, and by the larger differently shaped petals.

12. **R. sacculata** comb. nov. **Brunia sacculata** *Bolus ex Kirchner, Beitr. Kennt. Breslau* 15 (1904)! **Pseudobaeckea sacculata** *Dümmer in Journ. Bot.* L, suppl. 2, p. 25 (1912).

About 1·5 m. high, with villous upper branches and branchlets. Leaves closely set, sessile, ascending, 4—5 mm. long, oblanceolate-oblong, oblong-lanceolate or lanceolate, subacute or obtuse, villous on the dorsal surface, slightly concave and glabrous on the ventral surface. Flower-heads mostly 5—6 mm. wide, hemispheric. Bract leaf-like. Bracteoles 2 or 3, lanceolate, villous on the dorsal surface, reaching to the middle of the sepals. Calyx-tube villous, with a shallow cup-shaped free upper part : calyx-lobes lanceolate, villous on the dorsal surface, reaching to the middle of the petals. Petals 2 mm. long, obovate, narrowed at the base, obtuse, glabrous, with a transverse ridge near the base. Stamens reaching to the middle of the petals ; filaments with a knee-shaped thickening near the base : anthers 0·5 mm. long, rotund. Ovary $\frac{3}{4}$

inferior, villous on the upper part, with 2 uni- or biovulate chambers : styles free. Fruit unknown.

CERES DIV. : near Gydouw, Skurfdeberg, 5000 ft. Dec. *Bolus* in Herb. Austr.-Afr. 1154 ; Roodeberg, upper south-east slopes, Jan. *Esterhuysen* 1520.—PAARL DIV. : Wellington Sneeuwkop, among rocks, 5000 ft. Dec.—Febr. *Esterhuysen* 8643, 12458.

Placed in *Raspalia* on account of the structure of the ovary and the ease with which its thin-walled chambers may be separated.

13. **R. villosa** *Presl, Bot. Bemerk.* 39 (1844). **Brunia villosa** *E. Mey. in Drège, Zwei Pfl. Doc.* 169 (1844) nomen, *ex Sond. in Harv. & Sond. Fl. Cap.* ii, 315 (1861-62). **Pseudobaeckea villosa** *Nieden. in Engl. & Prantl, Pflanzenfam.* iii, 2a, 136 (1891).

About 1 m. high, with the upper branches and branchlets villous and reddish brown. Leaves mostly 2·5—4 mm. long, closely set, erect-spreading or spreading, sessile, lanceolate, narrowed towards the base, obtuse, flat or slightly concave on the ventral surface, ciliate, sparsely villous on the dorsal surface or on both surfaces, occasionally glabrous on both, with a distinct median vein. Flower-heads about 4 mm. wide, often grouped in raceme- or panicle-like clusters. Bract lanceolate, acute, villous on the dorsal surface. Bracteoles linear-lanceolate, villous on the dorsal surface. Calyx-tube sparsely pubescent, with a shallow cup-shaped free upper portion ; calyx-lobes lanceolate, glabrous on both surfaces, ciliate, reaching to shortly above the middle of the petals. Petals scarcely 1·5 mm. long, obovate-elliptic, obtuse, tapered towards the base, glabrous, bicarinate below the middle. Stamens reaching to the upper half of the petals ; anthers 0·25 mm. long, rotund. Ovary $\frac{2}{3}$ inferior, amply pubescent on the upper part, with 2 easily separated uniovulate chambers ; styles free. Fruit unknown.

CLANWILLIAM DIV. : Middelberg Plateau and summit of peak, 5000 ft. Dec. *Esterhuysen* 2475, 7257 ; Cederberg Mts., Nov.—March, *Stokoe* 6754, 7368, 9221, *Esterhuysen* (6000 ft.) 7561 ; peak at Koupoort, 4000–5000 ft. *Esterhuysen* 12182 ; Krakadouwsberg, 5000 ft. Oct. *Esterhuysen* 7502, 12091, 12094 ; Uitkyk Peak, 5000 ft. Dec. *Esterhuysen* 7376 ; Wolfberg, among rocks on the summit, *Esterhuysen* 2513 ; Kromme River, Dec. *Nieuwoudt* in Bolus Herb. 23046.

14. **R. phylicoides** *Arnott in Hook. Journ. Bot.* iii, 260 (1841) ; *Presl, Bot. Bemerk.* 39 (1844); *Nieden. in Engl. and Prantl, Pflanzenfam.* iii, 2a, 135 (1891) ; *Dümmer in Journ. Bot.* L, suppl. 2, p. 21 (1912). **Brunia phylicoides** *Thunb. in Hoffm. Phytogr. Blaetter* i, 18 (1803); ej. *Diss. Brun.* 7 (1804); ej. *Fl. Cap.* ed. Schultes 207 (1823); *DC. Prodr.* ii, 44 (1825). **Berardia phylicoides** *Brongn. in Ann. Sc. Nat.* viii, 381 (1826); *Sond. in Harv. & Sond. Fl. Cap.* ii, 321 (1861-62). **Nebelia phylicoides**

*Sweet, Hort. Brit.* ed 2, p. 116 (1830). **Brunia passerinoides** *Schldl. in Linnaea* vi, 190 (1831)!; *D. Dietr. Syn. Pl.* i, 849 (1839). **Raspalia passerinoides** *Presl, Bot. Bemerk.* 39 (1844); *Oliver in Hook. Ic Pl.* tab. 1524 (1886).

About 65 cm. high, with tomentose branchlets. Leaves sessile, appressed, about 2 mm. long, elliptic, apiculate, rounded-convex and at first pubescent on the dorsal surface, concave and pubescent on the ventral surface. Flower-heads mostly 4—5 mm. wide, spherical. Bract and bracteoles slightly shorter than the flower, spathulate, densely villous on the dorsal surface. Calyx-tube villous, with a cup-shaped free upper part: calyx-lobes almost as long as the petals, lanceolate, densely villous on the dorsal surface, glabrous on the ventral surface. Petals about 2·5 mm. long, linear-oblong, subacute, rounded-convex and villous on the dorsal surface, concave and sparsely pubescent on the ventral surface. Stamens shorter than the petals: anthers elliptic. Ovary ½ inferior, villous, with 2 uniovulate chambers: styles free. Fruit unknown.

Caledon Div.: without precise locality, Aug. *Ecklon & Zeyher* 1064; Houwhoek, 3500 ft. Febr. *Schlechter* 7339, *Bolus* (2600 ft. April) 5488. Nieuweberg, 2500 ft. Aug. *Bond* 480.

**Var. β, robusta** *Sond. in Harv. & Sond. Fl. Cap.* ii, 321 (1861-62) excl. syn. Thunb.; *Colozza in Ann. di Bot. Roma* ii, 33 (1905); *Dümmer in Journ. Bot.* L, suppl. 2, p. 21 (1912) excl. syn. Nieden., Thunb. **Brunia deusta** *Willd. in Denksch. Akad. Moench.* i, 127, tab. vii, fig. 2 (1808) non. Thunb. **Phylica squamosa** *Willd. ex Roem. & Schultes, Syst. Veg.* v, 491 (1819): plants more robust: leaves, flower-heads and flowers slightly larger: petals lanceolate-oblong.

Caledon Div.: top of Viljoen's Pass, May, *Pillans* 6299, *Salter* 611.

15. **R. globosa** comb. nov. **Passerina globosa** *Lam. Tabl. Encycl. et Meth.* ii, 431 (1797); ej. *Illus.* ii, 291, fig. 4 (1797); ej. *Encycl. Meth.* v, 42 (1804) excl. syn. Burm.; ej. *Encycl. Meth.* suppl. iv, 318 (1816). **Diosma squalida** *E. Mey. in Drège, Zwei Pfl. Doc.* 179 (1844) absque descr. **Brunia squalida** *Sond. in Harv. & Sond. Fl. Cap.* ii, 315 (1861-62). **Pseudobaeckea squalida** *Nieden. in Engl. and Prantl, Pflanzenfam.* iii, 2a, 136 (1891). **Raspalia squalida** *Dümmer in Journ. Bot.* L, suppl. 2, p. 21 (1912).

About 60 cm. high, with tomentose branches and branchlets. Leaves 4—6 mm. long, partly imbricate, sessile, ascending, oblanceolate-elliptic or oblong-elliptic, very obtuse, rounded-convex and densely villous on the dorsal surface, deeply concave and glabrous on the ventral surface, ciliate. Flower-heads mostly about 7 mm. wide, spherical. Bract leaf-like but narrower than the leaves. Bracteoles oblanceolate-linear, apiculate, villous on the dorsal surface, glabrous on the ventral surface.

Calyx-tube sparsely pilose, adhering to the ovary except for a shallow cup-shaped upper part : calyx-lobes about 2 mm. long, linear-lanceolate, silky-villous on the dorsal surface. Petals about 2 mm. long, elliptic, subacute, villous on the dorsal surface, occasionally shortly and sparsely pubescent on the upper half of the ventral surface, with a pair of marginal keels converging and thickening at the base. Anthers elliptic. Ovary $\frac{3}{4}$ inferior, densely villous on the upper part, with 2 uniovulate chambers : styles free, stout, villous at the base. Fruit unknown.

CALEDON DIV. : Landdrost Kop, 4000 ft. March, April, *Stokoe* 2837, 9219 ; Landdrost Kloof, July, *Stokoe* in S. Afr. Mus. Herb. 50447 ; near Landdrost Kop, 4500 ft. *Stokoe* in Bolus Herb. 23041 ; Sneeuwkop, *Stokoe* 6020, in S. Afr. Mus. Herb, 52246 ; east side of Sir Lowry's Pass, 1200 ft. May, *Bolus* 5327, in Herb. Norm. Austr.-Afr. 135 ; Nieuweberg, Oct. *Stokoe* 4033 ; Rooskraalberg, near summit, July, *Esterhuysen* 2658 ; Dwarsberg, Aug. *Stokoe* 8818 ; Moordenaar's Kop, July, *Stokoe* in S. Afr. Mus. Herb. 56831.

16. **R. Dregeana** *Nieden. in Engl. & Prantl, Pflanzenfam.* iii, 2a, 135 (1891) ; *Dümmer in Journ. Bot.* L, suppl. 2, p. 21 (1912). **Brunia phylicoides** *E. Mey. in Drège, Zwei Pfl. Doc.* 169 (1844) ! nomen, non Thunb. **Raspailia phylicoides** *Presl, Bot. Bemerk.* 39 (1844) absque descr., excl. syn. Brongn. **Berardia Dregeana** *Sond. in Harv. & Sond. Fl. Cap.* ii, 321 (1861-62) ! **Nebelia Dregeana** *O. Kuntze, Rev. Gen.* i, 233 (1891). **Berardia velutina** *Schltr. in Journ. Bot.* xxxvi, 25 (1898) !

About 90 cm. high, with silky-pubescent branchlets. Leaves about 3 mm. long, sessile, imbricate, ascending, lanceolate, acute, convex and villous on the dorsal surface, concave and glabrous on the ventral surface. Flower-heads mostly about 6 mm. wide, orbicular. Bract lanceolate, villous on the dorsal surface, reaching to the middle of the calyx. Bracteoles as long as the bract, linear, villous on the dorsal surface. Calyx-tube villous, adhering to the ovary except for a shallow cup-shaped upper part : calyx-lobes linear, densely villous on the dorsal surface, reaching to the middle of the petals. Petals about 1·75 mm. long, lanceolate-oblong, obtuse, villous on the dorsal surface, white, with a pair of submarginal keels on the lower half. Stamens almost twice as long as the petals : anthers oblong. Ovary almost entirely inferior, villous on the top, easily separating into halves, with 1—4 ovules in each chamber : styles free, diverging at the tips, reaching to about the middle of the stamens. Fruit unknown.

CERES DIV. : Baviaan's Berg, 5000 ft. Jan. *Stokoe* 4531, in S. Afr. Mus. Herb. 52716 ; Roodeberg, 5000 ft. Jan. *Compton* 8375 ; Laaken Vlei, Jan. *Phillips* 2024.—CLANWILLIAM DIV. : Ezelsbank, Dec. *Drège* in S. Afr. Mus. Herb. 15797, in Nat. Herb. Pretoria 12089 ; Cederberg,

marsh, 5000 ft. Jan. *Esterhuysen* 7589.—Worcester Div. : Matroosberg, Jan. *A. Bolus* in Guthrie Herb. 4404, in Bolus Herb. 6362, *Marloth* (Dec.) 2255, *Stokoe* 7627.

This species is distinguished from all others in the genus by its much exserted stamens.

### Imperfectly Known Species.

**R. affinis** *Nieden. in Engl. & Prantl, Naturl. Pfl.* iii, 2a, 135 (1891) ; *Dümmer in Journ. Bot.* L, suppl. 2, p. 20 (1912).=**Berardia affinis** *Sond.* (also imperfectly known).

**R. aspera** *E. Mey. in Drège, Zwei Pfl. Doc.* 215, nomen (1844).

VIII. NEBELIA *Neck. Elem.* i, 113 (1790) ; *Sweet, Hort. Brit.* ed. 2, p. 116 (1830) ; *O. Kze. Rev. Gen. Pl.* pars 1, p. 233 (1891) partim ; *Dümmer in Journ. Bot.* L, suppl. 2, p. 14 (1912) ; *Marloth, Fl. S. Afr.* ii, § 1, p. 37 (1925). **Berardia** *Brongn. in Ann. Sc. Nat.* viii, 380 (1826) partim ; *Endl. Gen.* 807, no. 4600 (1836-40) partim ; *Sond. in Harv. & Sond. Fl. Cap.* ii, 318 (1861-62) partim ; *Benth. & Hook. f. Gen. Pl.* i, 672 (1865) partim. **Heterodon** *Meissner, Gen.* 72 (1837) partim ; *Endl. Gen.* 808, no. 1605 (1836–40) excl. syn. Brunia. **Diberara** *Baillon in Bull. Soc. Bot. Linn. Par.* i, 279 (1881) ; *Nieden. in Engl. & Prantl, Pflanzenfam*, iii, 2a, 135 (1891).

Much branched undershrubs with ascending branches. Leaves imbricate, sessile or petiolate, lanceolate or oblanceolate, trigonous, ciliate, glabrous or partly villous. Stipules absent. Flowers subtended by a bract and 2 bracteoles, crowded in obconic, globose or ovate heads. Calyx-tube obconic, glabrous, adhering throughout to the ovary : calyx-lobes linear or linear-oblong, ± villous or ciliate. Petals free, linear or oblong, glabrous, tapered and bicarinate in the lower half, cream-coloured. Stamens much exserted : anthers ovate or oblong : thecae free in the lower half. Ovary $\frac{2}{3}$ or $\frac{3}{4}$ inferior, villous or minutely pubescent, with 2 uniovulate chambers : styles 2, free or shortly connate, slender exserted or almost so ; stigmas minute. Fruit dehiscent, 2-seeded, with bifid valves : seeds (imperfectly known) obovate-oblong, sulcate on the ventral surface, scabridous.

Name in honour of W. B. Nebel, a German professor of botany.

### Key to the Species.

Flower-heads apparently axillary, in compact globose groups :
- Calyx-lobes about 4 mm. long, ± ciliate ; petals about 5 mm. long ; ovary copiously villous on the top .. (1) *fragarioides*
- Calyx-lobes about 2 mm. long, villous on one or both sides of the upper half ; ovary glabrous or with a very few short hairs on the summit .. .. .. .. (2) *Stokoei*

Flower-heads on short branchlets, loosely clustered :

| | |
|---|---|
| Bracts at least twice as long as the flowers .. .. | (3) *paleacea* |
| Bracts less than twice as long as the flowers : | |
| Flower-heads ovoid or globose, 0·5—0·7 cm. wide ; petals about 2·5 mm. long .. .. .. .. | (4) *tulbaghensis* |
| Flower-heads turbinate or globose, 0·5—2 cm. wide ; petals 4·75—6·5 mm. long : | |
| Flower-heads turbinate ; leaves widest at the base .. | (5) *laevis* |
| Flower-heads globose ; leaves widest above the base | (6) *sphaerocephala* |

1. **N. fragarioides** *O. Kze. Rev. Gen.* i, 234 (1891). **Brunia fragarioides** *Willd. Sp. Pl.* i, pars 2, p. 1143 (1798) ; *F. G. Dietr. Vollst. Lexicon Gartn.* ii, 321 (1802) ; *Lam. Encycl. Suppl.* i, 712 (1810) ; *Aiton, Hort. Kew.* ed. 2, ii, 35 (1811) ; *DC. Prodr.* ii, 45 (1825) ; *Linn. Syst. Veg.* ed. 16, i, 782 (1825) ; *D. Dietr. Syn. Pl.* i, 849 (1839). **Brunia globosa** *Thunb. Diss. Brun.* 4 (1804) ; *Pers Syn. Pl.* i, 246 (1805) ; *Thunb. Fl. Cap.* ed. Schultes 205 (1823) ; *D. Dietr. Syn. Pl.* i, 848 (1839). **Berardia affinis** *Brongn. in Ann. Sc. Nat.* viii, 381 (1826) ; *Sond. in Harv. & Sond. Fl. Cap.* ii, 319 (1861-62). **Linconia capitata** *Banks ex Brongn.* l.c. **Nebelia affinis** *Sweet, Hort. Brit.* ed. 2, p. 116 (1830). **Berardia fragarioides** *Schldl. in Linnaea* vi, 190 (1831). **Berzelia** ? **globosa** *G. Don. Gen. Syst.* ii, 46 (1831-37). **Heterodon fragarioides** *Meissn. Gen. Comm.* 52 (1837). **Berardia globosa** *Sond. in Harv. & Sond. Fl. Cap.* ii, 320 (1861-62). **Diberara affinis**, **fragarioides** and **globosa** *Baill. in Bull. Soc. Linn. Par.* i, 279 (1881) ; *Nieden. in Engler & Prantl, Pflanzenfam.* iii, 2a, 136 (1891). **Nebelia globosa** *Dümmer in Journ. Bot.* L, suppl. 2, p. 15 (1912).

Usually about 60 cm. high, with sparsely pilose branchlets. Leaves on the upper parts mostly 3—5 mm. long, on the lower parts 5—8 mm. long, sessile, ascending, slightly incurved, lanceolate to lanceolate-linear, acute, convex and bluntly keeled on the dorsal surface, flat and with a narrow keel on the ventral surface, at first ciliate, often villous on the dorsal keel, with a tuft of hairs at the base of the ventral surface. Flower-heads about 8 mm. long (excluding stamens), obconic, slightly compressed dorsally, involucred by many scale-like oblanceolate ciliate leaves, apparently axillary, crowded in a globose mass 1·5—2 cm. long : receptacle densely villous. Bract about 6 mm. long, oblanceolate, acuminate, ciliate, keeled on the upper half of the dorsal surface. Bracteoles similar but narrower and glabrous. Calyx-lobes about 4 mm. long, oblanceolate-linear, acute, keeled on the dorsal surface, ± ciliate. Petals about 5 mm. long, obtuse, membranous, conspicuously keeled at the middle, cream-coloured. Stamens twice as long as the petals : anthers 1·5 mm. long, oblong. Ovary $\frac{2}{3}$ inferior, villous on the summit ; ovules attached to the middle of the chambers : styles reaching to near the tips of the petals. Seeds about 2·5 mm. long, with a ridge within the ventral furrow.

SOUTH AFRICA : without precise locality, *Hutchinson* 630.—CALEDON

Div. : Hottentots Holland Mts., near Palmiet River, *Ecklon & Zeyher* 1081, *Zeyher* 2650, *Pappe* in S. Afr. Mus. Herb. 36291, *Stokoe* (Dec.) 6009, in S. Afr. Mus. Herb. 37689 ; Sir Lowry's Pass, *Schlechter* 7228 ; Steenbras, Sept. *Stokoe* 9132, *Galpin* 12265 ; near Grabouw, *Andreae* 1058a, 1058b ; Nieuweberg, 2500 ft. Aug. *Compton* 9227 ; *Elgin* 3000 ft. *Compton* 6418 ; Roos Kraal, *Hubbard* 438 ; between Somerset Sneeuwkop and Sugar Loaf, Feb. *Stokoe* 8907 ; mountains east of Steenbras Valley, *Stokoe* in Bolus Herb. 16952 ; east slopes of Somerset Sneeuwkop, 3000—4000 ft. *Esterhuysen* 2623 ; mountains between Sir Lowry's Pass and Hanglip, Oct. *Stokoe* in Bolus Herb. 14198 ; Kogelberg, Oct. *Lamb* 2974, Stokoe 999, *Esterhuysen* 9970 ; Hanglip, 500 ft. Sept. *Compton* 13529 ; west end of Buffel's Mt., *Pillans* 8270 ; mountains behind Betty's Bay, 1500 ft. *Leighton* 1006 ; Kleinmond, Sept. *Stokoe* in Bolus Herb. 17501.—Ceres Div. : east slopes of the Skurfdeberg, Dec. *Bodkin* in Bolus Herb. 7480.—Paarl Div. : Pic Blanc, *Stokoe* in S. Afr. Mus. Herb. 56797.—Worcester Div. : Hex River Mts., shale band below Milner Peak, 5000—5500 ft. *Esterhuysen* 9395.

2. **N. Stokoei** sp. nov. ; ramulis pilosis ; foliis sessilibus lanceolatis acutis ciliatis, supra planis, utrinque carinatis ; capitulis obconicis ; bractea oblanceolata ciliata, infra carinata ; sepalis lineari-oblongis, basin versus attenuatis, dorso villosis ; petalis anguste linearibus, basin versus attenuatis ; antheris oblongis ; ovario apice minute pubescente ; stylis infra medium connatis.

About 60 cm. high, with pilose branchlets. Leaves mostly 4—5 mm. long, at first imbricate, becoming separated, ascending, slightly incurved, sessile, lanceolate, acute, convex and bluntly keeled on the dorsal surface, flat and with a narrow keel on the ventral surface, at first with a tuft of hairs at the apex and ± ciliate. Flower-heads 5—6 mm. long (excluding stamens), obconic, involucred by many scale-like oblanceolate ciliate leaves, apparently axillary, crowded in globose masses 1—1·5 cm. long : receptacle densely villous. Bract 4 mm. long, oblanceolate, subacute, tapered at the base, bluntly keeled on the dorsal surface, ciliate. Bracteoles 3 mm. long, resembling the bract, occasionally sparsely villous on the upper half of the dorsal surface. Calyx-lobes about 2 mm. long, linear-oblong in the upper half, narrowing considerably to the base, subacute, villous on the dorsal surface and occasionally also on the upper half of the ventral surface. Petals about 3 mm. long, narrowly linear, obtuse, slightly narrowed downwards from shortly below the middle, membranous. Filaments slender : anthers 1·25 mm. long, oblong. Ovary $\frac{2}{3}$ inferior, minutely pubescent on the summit ; ovules attached to about the middle of the dissepiment : styles slightly connate in the lower half. Seeds about 2 mm. long, with a ridge within the ventral furrow.

Ceres Div. : Gydouw Plateau, Dec. 1933, *Stokoe* 9223 (type, in Bolus Herb.) ; Michell's Pass, Slab Peak, *Esterhuysen* 7998.—Worcester Div. : Milner Peak, south-east side, shale band, 5500 ft. *Esterhuysen* 7802.

The affinity is with *N. fragarioides* from which it is distinguished by much smaller differently shaped hairy calyx-lobes, much smaller floral parts, and by the almost total absence of hairs from the top of the ovary.

3. **N. paleacea** *Sweet, Hort. Brit.* ed. 2, p. 116 (1830) ; *Dümmer in Journ. Bot.* L, suppl. 2, p. 14 (1912). **Brunia paleacea** *Berg. Descr. Pl. Cap.* 56 (1767) ; *Linn. Mant.* 559 (1767) ; *Thunb. Prodr.* 41 (1794) ; *Linn. Syst. Veg.* ed. 15, p. 251 (1797) ; *Willd. Sp. Pl.* i, pars 2, p. 1142 (1798) ; *F. G. Dietr. Vollst. Lexicon Gärtn.* ii, 322 (1802) ; *Thunb. Diss. Brun.* 6 (1804) ; *Wendl. Collect.* tab. 21 (1805) ; *Willd. in Denkschr. Acad. Muench.* i, 127, tab. 8, fig. 1 (1808); *Aiton, Hort. Kew.* ed. 2, ii, 34 (1811) ; *Thunb. Fl. Cap.* ed. Schultes 206 (1823) ; *Linn. Syst. Veg.* ed. 16, i, 782 (1825) ; *DC. Prodr.* ii, 44 (1825) excl. syn. ; *D. Dietr. Syn. Pl.* i, 848 (1839) ; *Richter, Syst.* 217 (1840). **Berardia paleacea** *Brongn. in Ann. Sc. Nat.* viii, 381, tab. 37, fig. 2 (1826) ; *Sond. in Harv. & Sond. Fl. Cap.* ii, 319 (1861-62). **Brunia Thunbergiana** *D. Dietr. Syn. Pl.* i, 849 (1839). **Diberara paleacea** *Baill. in Bull. Soc. Linn. Par.* i, 279 (1881).

Usually 40—60 cm. high, dense, with sparsely pubescent branchlets. Leaves erect, slightly incurved, with a broad decurrent and strongly keeled petiole ; the upper mostly 3—4 mm. long, linear-lanceolate, subacute, keeled on both surfaces, with a tuft of hairs at the base of the ventral surface and at the apex ; the lower mostly 4—6 mm. long, lanceolate, appressed, glabrous. Flower-heads mostly 5—7 mm. wide (excluding bracts), globose, involucred, usually crowded in corymbiform clusters ; involucral leaves about twice as long as the others, appressed, lanceolate, attenuate, ciliate in the lower half, cream-coloured. Bract usually 0·6—1 cm. long, much exceeding the flower in length, lanceolate long-attenuate, cartilaginous, ciliate at the base, cream-coloured. Bracteoles shortly exceeding the flower, lanceolate, attenuate towards the base, villous on both surfaces. Calyx-lobes about 2 mm. long, linear-oblong, acute, villous on both surfaces of the upper half. Petals 2—2·5 mm. long, linear-oblong, obtuse, with a pair of prominent keels tapering downwards from the middle. Anthers 0·75 mm. long, ovate. Ovary ¾ inferior, villous on the upper part, splitting readily into halves. Fruit splitting vertically into halves, 2-seeded : seeds oblong-eliptic, rounded on the dorsal surface, almost flat and slightly furrowed on the ventral surface, scabrid, black.

Bredasdorp Div. : summit of mountain near Bredasdorp, *Galpin* 10465.—Caledon Div. : Hottentots Holland Mts. *Ecklon & Zeyher* 1080 ;

Steenbras, *Rogers* 17865 ; Sir Lowry's Pass, *Thorne* in S. Afr. Mus. Herb. 50422 ; Palmiet River, 800 ft. Oct. *Schlechter* 5428 ; Somerset Sneeuwkop 4000 ft. Dec. *Esterhuysen* 8271 ; Grabouw, c. 900 ft. Dec. *Bolus* 4179, *Guthrie* 3878, *Andreae* 1067 ; Dwarsberg, Aug. *Stokoe* 8819, in S. Afr. Mus. Herb. 56799 ; Kogelberg, south-east slopes, Jan. *Esterhuysen* 9963 ; Platberg, *Andreae* 874 ; Hanglip, Jan. *Pillans* 8277 ; Moordenaars Kop, Oct. *Esterhuysen* 9128 ; Babylons Tower, 3000 ft. Febr. *Esterhuysen* 4988 ; Houwhoek, c. 1200 ft. May, *MacOwan & Bolus* in Herb. Norm. Austr.-Afr. 137 ; Villiersdorp, 1500 ft. Jan. *Schlechter* 9919 ; Genadendal, Dec. *Pappe* in S. Afr. Mus. Herb. 15798, *Bolus* (Jan.) 7385 ; Zwartberg, Nov. *Zeyher* 2649, *Purcell* in S. Afr. Mus. Herb. 46160 ; mountains at Onrust River, 1500 ft. Nov. *Esterhuysen* 4256 ; Hermanus, Sept. *Barker* 1839, *Galpin* (Oct.) 4041, 4042 ; Mossel River, mountain slopes, Jan. *L. Guthrie* in Bolus Herb. 23059, *Pole Evans* 470, Potts in S. Afr. Mus. Herb. 4984 ; Zonder Einde Mts. 3000—4000 ft. *Barnard* 421 ; Sandfontein, *Galpin* 4041.—Clanwilliam Div. : Cederberg, Nov. *Pattison* in Bolus Herb. 14473.—Paarl Div. : Du Toit's Kloof, Nov.—Jan. *Drège* in Nat. Herb. Pretoria 9587 ; north of Du Toit's Kloof, Zuurvlakte 2000—3000 ft. Dec. *Esterhuysen* 12327 ; French Hoek, Oct. *Phillips* 1123 ; French Hoek Pass, 3000 ft. Nov. *Compton* 8175, *Galpin* 12263 ; French Hoek Forest Reserve, Jan. *Compton* 12979, *Esterhuysen* 10090, in Bolus Herb. 23061 ; Berg River Hoek, Jan. *Compton* 8327 ; Wemmershoek Mts., Tierkloof, Dec. *Esterhuysen* 4074 ; La Motte Forest Reserve, 1500 ft. *Compton* 5348 ; Slanghoek Mts. Krom River Dome, *Esterhuysen* 11528 ; Bailey's Peak, 4000 ft. *Esterhuysen* 1620 ; between Limietberg and Bailey's Peak, *Esterhuysen* 1642 ; between Bailey's Peak and Pic Blanc, *Esterhuysen* 1646.—Riversdale Div. : Albertinia, *Muir* 856.—Stellenbosch Div. : Jonkershoek, *Marloth* 1843 ; Guardian Peak, *Esterhuysen* 7825, 11969 ; top of Diepgat Ravine, 3500 ft. Jan. *Esterhuysen* 9796 ; Jonkershoek Twins, 3000 ft. Febr. *Esterhuysen* 11483 ; clay slopes below Pic Sans Nom, 2000 ft. Jan. *Esterhuysen* 12516.

4. **N. tulbaghensis** *Dümmer in Journ. Bot.* L, suppl. 2, p. 15 (1912) ! **Berardia tulbaghensis** *Schltr.* ms. in herb.

About 50 cm. high, with slender sparsely villous branchlets. Leaves mostly 2·5—3·5 mm. long, sessile, ascending, slightly incurved above the middle, lanceolate, subacute, keeled on the convex dorsal surface and on the flat ventral surface, with a tuft of hairs at the base of the ventral surface, at first tipped with hairs and minutely ciliate. Flower-heads terminal, 5—7 mm. wide, ovoid or globose, surrounded at the base by normal leaves. Bract about 4 mm. long, ovate-lanceolate in the upper half, tapering to the base, slightly keeled on both surfaces of the upper half, incurved, pubescent on the ventral surface. Bracteoles about

2·5 mm. long, elliptic, obtuse, long-tapering to the base, rounded-convex on the dorsal surface, keeled on the ventral surface, pubescent on both surfaces of the upper half. Calyx-lobes 1·5 mm. long, linear-oblong, acute, pubescent on the dorsal surface. Petals about 2·5 mm. long, linear, obtuse, conspicuously keeled from shortly above the middle downwards. Anthers about 0·5 mm. long, ovate-oblong. Ovary ⅔ inferior, villous on the upper part; ovules attached shortly above the middle of the dissepiment.

TULBAGH DIV.: Nieuwekloof, 3000 ft. Febr. 1896, *Schlechter* 7500.

5. **N. laevis** *O. Kze. Rev. Gen.* pars i, 233 (1891); *Dümmer in Journ. Bot.* L, suppl. 2, p. 14 (1912); **Berardia laevis** *E. Mey. in Drège, Zwei Pfl. Doc.* 116 (1844) nom. *Sond. in Harv. & Sond. Fl. Cap.* ii, 319 (1861–62). **Diberara laevis** *Baill. in Bull. Soc. Linn. Par.* i, 279 (1881); *Nieden. in Engl. & Prantl, Pflanzenfam.* iii, 2a, 136, fig. 75, p, q (1891); *Engl. & Drude, Veget. Erde* ix, 1, 2, p. 487, figures p, q (1910).

About 90 cm. high, with villous branchlets. Leaves on the upper parts 4—5 mm. long, on the lower parts mostly 0·6—1 cm. long, sessile, lanceolate, acute, ascending, incurved, broad and thickened at the base, bluntly keeled on the dorsal surface, convex on the ventral surface, ciliate throughout, becoming glabrous. Flower-heads about 1 cm. wide, broadly obconic, involucred, crowded in corymbiform clusters: involucral leaves about twice the length of others, otherwise resembling them. Bract shortly overtopping the petals or almost so, leaf-like, lanceolate, attenuate towards the base, concave on the ventral surface, ciliate. Bracteoles 5 mm. long, oblanceolate, attenuate towards the base, appressed-villous on both surfaces of the upper half. Calyx-lobes about 2·75 mm. long, linear, acute, membranous, villous on the upper parts of both surfaces. Petals scarcely 5 mm. long, slightly widened above the middle, obtuse, membranous, with folded keels on the lower half, with a ridge from the keels to the apex. Anthers about 1·25 mm. long, oblong. Ovary ⅔ inferior, villous on the upper part.

CALEDON DIV.: mountain at Genadendal, 4000 ft. *Schlechter* 9813, *Bolus* (Jan.) 7386, *Stokoe* 6008; Wildepaardeberg, near the summit, *Stokoe* 1083a, *Andreae* 347; River Zonder Einde Mts. 3500—4000 ft. Jan. *Stokoe* 7457.—WORCESTER DIV.: Bosjesveld Mts., on rocks, 4500 ft. Febr. *Stokoe* 7329.

6. **N. sphaerocephala** *O. Kze. Rev. Gen.* pars i, p. 233 (1891). **Brunia macrocephala** *E. Mey. in Drège, Zwei Pfl. Doc.* 81 (1844) nomen non Willd. **Berardia sphaerocephala** *Sond. in Harv. & Sond. Fl. Cap.* ii, 319 (1861-62). **Diberara macrocephala** *Baill. in Bull. Soc. Linn. Par.* i, 279 (1881); *Nieden. in Engl. & Prantl, Pflanzenfam.* iii, 2a, 136 (1891).

Usually 1 m. high (occasionally 1·5 m.), robust, with villous branchlets.

Leaves sessile, erect-spreading, incurved, the upper 4—5 mm. long, oblanceolate, linear-oblanceolate or oblong-lanceolate, convex and bluntly keeled on the dorsal surface, convex and with a prominent median vein on the ventral surface, ciliate, usually ± villous on the dorsal surface ; lower leaves often appressed and glabrous, occasionally linear-oblong. Flower-heads terminal, 1·5—2 cm. long, globose, subtended by leaves ; receptacle villous. Bract leaf-like, tapering to both ends, villous on the dorsal surface, reaching the tips of the petals or almost so. Bracteoles oblanceolate-linear, tapering from the middle downwards, villous on the upper half of the dorsal surface, reaching well above the middle of the petals. Calyx-lobes 4—5 mm. long, linear, acute, villous on the upper half of the dorsal surface. Petals about 6·5 mm. long, linear, very obtuse, tapering in the lower half, with prominent keels tapering from well above the middle to near the base. Anthers scarcely 1·5 mm. long, ovate-oblong. Ovary ¾ inferior, villous on the upper part : ovules attached to the upper half of the chambers. Seeds about 3 mm. long, convex and slightly striate on the dorsal surface, black.

Caledon Div. : Hottentots Holland Mts., Langkloofberg, 3000—4000 ft. *Esterhuysen* 9147 ; Somerset Sneeuwkop, east slopes, 4250 ft. March, *Stokoe* 5022, in S. Afr. Mus. Herb. 56800, *Esterhuysen* 2622.—Paarl Div. : Du Toit's Kloof Mts. Jan. *Marloth* 2492 ; Zuurvlakte, *Primos* in Marloth Herb. 11672 ; Wellington Sneeuwkop, *J. C. Smuts* in Bolus Herb. 23062, *Esterhuysen* (4500 ft. Dec.) 12419 ; Wemmershoek Mts., Tafelberg, 5000—5700 ft. *Esterhuysen* 10016, *Wasserfall* (Oct.) 561 ; Haalhoek Sneeuwkop, east slopes, 4000 feet, Dec. *Esterhuysen* 9671 ; Winterberg, south-east slopes, 5500 ft. Dec. *Esterhuysen* 9662, north slope, *Esterhuysen* 9661 ; Slanghoek Mts., Witteberg, gully on south side, 5500—6000 ft. *Esterhuysen* 9478 ; Observation Peak, Jan. *Esterhuysen* 1708.—Stellenbosch Div. : mountains near Stellenbosch, April, *Dyke* in Marloth Herb. 4420 ; Triplets, 4000 ft. *Esterhuysen* 8270.—Worcester Div. : Bosjesveld Mts. *Stokoe* in S. Afr. Mus. Herb. 56802.

### Imperfectly Known Species.

**N. aspera** *O. Kze. Rev. Gen.* i, 233 (1891) = [**Raspalia aspera** *E. Mey in Drège, Zwei Pfl. Doc.* 215, nomen (1844)] **Berardia aspera** *Sond. in Harv. & Sond. Fl. Cap.* ii, 321.

**N. Sonderiana** *O. Kze.* op. cit. 234 = **Berardia affinis** *Sond.* op. cit. 320, non Brongn. (also imperfectly known).

IX. MNIOTHAMNEA *Nieden. in Engl. & Prantl, Pflanzenfam.* iii, 2a, 136 (1891) ; *Dümmer in Journ. Bot.* L, suppl. 2, p. 19 (1912) ; *Thonner, Fl. Pl. Afr.* 237 (1915) ; *Marloth, Fl. S. Afr.* ii, § 1, p. 37 (1925) ; *Phillips,*

*Gen. S. Afr. Fl. Pl.* 291 (1926). "**Berzelia?** (§ **Mniothamnea**)" *Oliver in Journ. Linn. Soc. Bot.* ix, 333 (1867)!

Much branched undershrubs with ascending or decumbent branches. Leaves loosely imbricate, eventually separating, sessile, ovate, elliptic-ovate, lanceolate-ovate or ovate-lanceolate, rounded-convex and pilose or glabrous on the dorsal surface. Stipules absent. Flowers minute, terminal or axillary, solitary, sessile, subtended by 2 bracteoles. Calyx-tube obconic, longitudinally ridged, hispid, villous or pilose, adhering to the ovary except for the narrow upper margin: calyx-lobes valvate, deltoid-lanceolate or ovate-deltoid. Petals free, ovate, lanceolate-ovate, ovate-lanceolate or elliptic-ovate, ± pubescent or pilose on the dorsal surface, bicarinate near the base. Stamens included: anthers rotund; thecae free in the lower half. Ovary ¾ inferior, pubescent on the top, unilocular, uniovulate: style simple, slender, included: stigma minute. Fruit (imperfectly known) elliptic, longitudinally ridged: seeds (imperfectly known) elliptic, angular, smooth.

Name derived from the Greek *mnion*, moss and *thamnos*, a shrub.

KEY TO THE SPECIES.

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| Stems ascending, usually 30—80 cm. high; leaves bearing ascending hairs on the dorsal surface except when that part is glabrous .. .. .. .. .. .. .. | (1) *callunoides* |
| Stems decumbent, forming a tangled mass usually 1—1·5 cm. high; leaves bearing spreading hairs on the dorsal surface.. | (2) *bullata* |

1. **M. callunoides** *Nieden. in Engl. & Prantl, Pflanzenfam.* iii, 2a, 136 (1891); *Dümmer in Journ. Bot.* L, suppl. 2, p. 19 (1912). **Berzelia callunoides** *Oliver in Journ. Linn. Soc. Bot.* ix, 333 (1867)!; *in Hook. Ic. Pl.* tab. 1014 (1867). **Mniothamnea micrantha** *Schltr. in Engl. Bot. Jahrb.* liii, 317 (1915)!

Usually 30—80 cm. high, with wiry stems. Branchlets very many, usually crowded, slender, densely tomentose. Leaves 1—2 mm. long, appressed at the base, ovate, lanceolate-ovate or ovate-lanceolate, subacute or obtuse, apiculate, broad-based; dorsal surface occasionally rather acutely convex at first, scabridous, pilose or glabrous; ventral surface concave, glabrous or pilose at the base. Bracteoles 2 (occasionally another on the base of the calyx-tube), opposite, linear, ciliate, appressed to and scarcely as long as the minutely and sparsely hispid or pilose calyx-tube. Calyx-lobes 0·5 mm. long, ovate-deltoid, ciliate, glabrous, or pilose on the dorsal surface. Petals 0·75—1·25 mm. long, ovate, lanceolate-ovate or elliptic-obovate, subacute, cream-coloured, slightly concave on the ventral surface, with a pair of short keels converging and forming a transverse thickening near the base. Anthers 0·25 mm. long, reaching to the upper half of the petals. Style reaching to the middle of the petals. Fruit minutely and sparsely hispid or pubescent.

Riversdale Div. : Kampsche Berg, *Burchell* 7097.—Swellendam Div. : mountain peak near Swellendam, Jan. 1815, *Burchell* 7382 ; south slopes of the Langebergen nearest Swellendam, Febr. *Esterhuysen* 4802 ; mountains near Puspas Vlei, Voormansbosch, Duivelsbosch and Keurbooms River, Oct. *Zeyher* 312 ; Langebergen above Strawberry Hill, lower south slopes, swampy soil, Sept. *Esterhuysen* 10407 ; Langebergen near Zuurbraak, c. 2000 ft. Jan. *Schlechter* 2040 ; Naauwpoort Peak, 2000—3000 ft. Nov. *Thorne* in S. Afr. Mus. Herb. 44550.

2. **M. bullata** *Schltr. in Engl. Bot. Jahrb.* liii, 318 (1915) !

Undershrubs with decumbent much branched wiry stems usually forming a tangled mass 1—1·5 cm. high. Branchlets slender variably pilose. Leaves mostly 1·5—3 mm. long, slightly imbricate, erect, broad-based, ovate or elliptic-ovate, acute, rounded-convex and pilose on the dorsal surface, becoming almost glabrous ; the ventral surface deeply concave, glabrous or pilose. Bracteoles opposite, lanceolate, pilose on the dorsal surface, scarcely as long as the calyx-tube. Calyx densely villous on the outer surface : calyx-lobes 0·75 mm. long, deltoid-lanceolate, acute. Petals scarcely 1.5 mm. long, ovate-lanceolate, acute, shortly incurved at the apex, convex and pilose on the dorsal surface, concave and glabrous on the ventral surface, with short fleshy keels converging at the base. Anthers reaching to the upper half of the petals, scarcely 0·5 mm. long, rotund. Ovules angular. Style reaching to the middle of the petals. Fruit elliptic, with 10 acute ridges.

Swellendam Div. : Langebergen near Zuurbraak, rock-crevices (" creeping on wet rocks, like *Selaginella rupestris* ") c. 3500 ft. Jan. *Schlechter* 2097 ; Lemoenshoek Peak, ledges on the south side below the summit (" sprawling, forming mats ") 5300 ft. Sept. *Esterhuysen* 10479.

X. STAAVIA *Dahl, Obs. Bot.* 15 (1787) ; *Thunb. Nov. Gen.* vii, 110 (1792) ; *Willd. Sp. Pl.* i, pars 2, p. 1144 (1798) ; *Pers. Syn. Pl.* i, 246 (1805) ; *Aiton, Hort. Kew.* ed. 2, ii, 35 (1811) ; *Thunb. Fl. Cap.* ed. Schultes 207 (1823) ; *DC. Prodr.* ii, 45 (1825) ; *Brongn. in Ann. Sc. Nat.* viii, 378 (1826) ; *Harv. Gen. S. Afr. Pl.* 127 (1838) ; *Endl. Gen.* 807, no. 4599 (1839) ; *Sond. in Harv. & Sond. Fl. Cap.* ii, 321 (1861-62) ; *Benth. & Hook. f. Gen. Pl.* i, 672 (1865) ; *Harv. Gen. S. Afr. Pl.* ed. 2, p. 105 (1868) ; *Nieden. in Engl. & Prantl, Pflanzenfam.* iii, 2a, 136 (1891) ; *Dümmer in Journ. Bot.* L, suppl. 2, p. 26 (1912) ; *Thonner, Fl. Pl. Afr.* 237 (1915) ; *Marloth, Fl. S. Afr.* ii, § 1, p. 39 (1925) ; *Phillips, Gen. S. Afr. Fl. Pl.* 290 (1926) ; *Levyns, Guide to Flora of Cape Peninsula* 139 (1929). **Levisanus** *Schreb. Gen.* i, 149 (1789). **Astrocoma** *Neck. Elem.* i, 112 (1790).

Moderately or much branched undershrubs with ascending branches.

Leaves closely set or imbricate, petiolate, linear, lanceolate or oblong, ± trigonous or flat, ciliate or sparsely pilose, soon becoming glabrous. Stipules present or absent, minute, subulate. Flowers small, subtended by a bract and bracteoles, crowded in ± conspicuously involucred heads. Calyx-tube obconic or turbinate, smooth or longitudinally ridged, ± villous or pilose, adhering to the ovary throughout or with a free upper margin forming a shallow cup: calyx-lobes deltoid and acuminate, lanceolate or subulate, glabrous, ciliate, or villous on the dorsal surface, often with caducous hairs. Petals free, oblong, elliptic, obovate or oblanceolate, glabrous, or pilose on the dorsal surface, with a pair of keels on the lower half converging into a transverse thickening near the base of the ventral surface. Stamens included: anthers oblong, elliptic, ovate or rotund: thecae free in the lower half. Ovary inferior or almost so, with 2 uniovulate chambers: styles 2, included, connate throughout or with diverging tips; stigmas conical. Fruit (imperfectly known) dehiscing down 2 sides, 1- or 2-seeded: seeds elliptic or rotund, smooth or ridged, clasped by a cup-shaped aril at the base.

Named in honour of Martin Staaf, a correspondent of Linnaeus.

KEY TO THE SPECIES.

Flower-heads (excluding the involucre) mostly 0·8—1·2 cm. wide; flowers distinctly agglutinate:
- Leaves linear, usually 1—1·5 cm. long; bract and bracteoles acicular .. (8) *glutinosa*
- Leaves oblong, usually 0·6—1 cm. long; bract and bracteoles linear-spathulate .. (10) *Dodii*

Flower-heads (excluding the involucre) mostly narrower, or if scarcely so then the flowers are not agglutinate:
- Leaves about 3 mm. long .. (4) *verticillata*
- Leaves much longer, rarely reduced to 4 mm. in length:
  - Leaves of the inner series of the involucre 5—8 mm. long:
    - Leaves of the inner series of the involucre widest below the middle; calyx-lobes deltoid, acuminate .. (7) *Zeyheri*
    - Leaves of the inner series of the involucre widest at or above the middle; calyx-lobes lanceolate, acuminate (9) *Brownii*
  - Leaves of the inner series of the involucre not exceeding 5 mm. in length:
    - Leaves parallel-sided .. (3) *Dregeana*
    - Leaves not parallel-sided:
      - Leaves widest above the middle .. (2) *phylicoides*
      - Leaves widest below the middle:
        - Leaves lanceolate, linear-lanceolate or lanceolate-linear, acute, keeled on the upper half of the ventral surface .. (1) *radiata*
        - Leaves wider, lanceolate, oblong- or ovate- lanceolate, very obtuse or truncate, not keeled on the ventral surface:
          - Leaves of the involucre widest above the middle .. (6) *trichotoma*
          - Leaves of the involucre not widest above the middle, mostly linear-oblong .. (5) *comosa*

1. **S. radiata** *Dahl, Obs. Bot.* 15 (1787); *Thunb. Nov. Gen.* vii, iii (1792); ej. *Prodr. Pl. Cap.* 41 (1794); *Willd. Sp. Pl.* i, pars 2, p. 1144

(1798) ; *Pers. Syn. Pl.* i, 247 (1805) ; *Willd. in Denksch. Akad. Moench.* 133 (1809) ; *Aiton, Hort. Kew.* ed. 2, ii, 35 (1811) ; *Wendl. Coll. Pl.* iii, 11, tab. 82 (1819) ; *Thunb. Fl. Cap.* ed. Schultes 207 (1823) ; *DC. Prodr.* ii, 45 (1825) ; *Spreng. Syst. Veg.* i, 781 (1825) ; *Brongn. in Ann. Sc. Nat.* viii, 379, tab. 36, fig. 2 (1826) ; *Ecklon & Zeyher, Enum. Pl.* 140 (1835) incl. var. ; *Schnizlein, Iconogr.* iii, tab. 168, figs. 17-22 (1857-65) ; *Sond. in Harv. & Sond. Fl. Cap.* ii, 322 (1861-62) excl. var. γ ; *Colozza in Ann. Bot. di Roma* ii, 22 (1905) ; *Dümmer in Journ. Bot.* L, suppl. 2, p. 29 (1912) ; *Marloth, Fl. S. Afr.* ii, § 1, p. 39 (1925) ; *Levyns, Guide to Flora of Cape Peninsula* fig. 91 (1929). [**Chrysanthemum ericoides**—*Breyn. Cent.* 165, tab. 82 (1678) ; *Morison, Hist.* iii, 21, folio 6, tab. 3, fig. 43 (1699) ; *Pluk. Mant.* 47, tab. 454, fig. 7 (1700)]. **Phylica radiata** *Linn. Cent.* i, 8 (1755) ; *in Amoen. Acad.* iv, 268 (1759) ; ej. *Sp. Pl.* ed. 2, p. 283 (1763). **Brunia radiata** *Berg. Descr. Pl. Cap.* 58 (1767) ; *Linn. Mant.* ii, 209 (1771) ; ej. *Syst. Veg.* ed. 13, p. 200 (1774) ; *Lam. Encycl. Meth.* i, 475 (1785) ; *Aiton, Hort. Kew.* ed. 1, i, 277 (1789) ; *Murr. Syst. Veg.* 251 (1797) ; *Richter, Syst.* 217 (1840). ? **Phylica nuda** *Burm. f. Fl. Cap. Prodr.* 6 (1768). **Staavia pinifolia** *Willd. in Denkschr. Akad. Moench.* i, 133, tab. 8 (1809).

Usually 60—80 cm. high, normally much branched, with pilose branchlets. Leaves mostly 4—7 mm. long, closely set, lanceolate-linear or lanceolate, acute or, less often, obtuse, apiculate, keeled throughout the length of the dorsal surface and the upper half of the ventral surface, furrowed up the lower half of the ventral surface, scabrid, at first ciliate, becoming glabrous, erect-spreading, mostly curved outwards from the middle. Stipules minute, subulate. Flower-heads terminal, solitary or clustered, 3—5 mm. wide, with 1 or rarely 2 flowers open at the same time, involucred and overtopped by enlarged very obtuse whitish leaves. Bract and bracteoles acicular, reaching to the middle of the petals, with caducous hairs on the dorsal surface. Calyx-tube obconic, clothed with caducous unicellular hairs, adhering to the ovary except for the upper cup-shaped part : calyx-lobes lanceolate, subulate-acute, with caducous hairs on the dorsal surface, reaching to the tips of the petals. Petals about 2 mm. long, obovate-oblong or elliptic, very obtuse, glabrous or with a few hairs on the upper half of the dorsal surface, pale mauve. Anthers about 0·5 mm. long, rotund. Styles united throughout, reaching to the upper half of the petals. Fruit unknown.

BREDASDORP DIV. : Brandfontein, *Smith* 3132, 4997 ; Ratel River, Sept. *Compton* 14776 ; hills at Elim, Aug. *Compton* 9129.—CALEDON DIV. : between Bot River and Onrust River, Aug. *Zeyher* 2646 ; slopes above Mossel River, *L. Guthrie* in Bolus Herb. 23045 ; Hermanus, Sept. *Barker* 1861 ; Danger Point, 1170 ft. *Leighton* 1577.—CAPE DIV. : flats

and hills near Cape Town, Jan.–Nov. *Pappe* in S. Afr. Mus. Herb. 15799, *Bolus* 7933, *Humbert* 9475, *Compton* 7673, *Letty* 218, *Marloth* 63, *Ecklon & Zeyher* 1075, *Zeyher* 650, *Ecklon* Herb. Un. Itin. 767, 768; south base of the Tigerberg, *Pillans* 4763 ; Durbanville, *Barker* 1756 ; Devil's Peak, below King's Blockhouse, *W. Dod* 259 ; Groot Kop, 2000 ft. Jan. *Esterhuysen* 10021 ; Table Mt. *Muir* 755, *Thode* A103, *Bolus* 7933b ; Constantiaberg, 2500 ft. *Compton* 8274, *Bond* 194 ; Chapman's Peak, *Compton* 8488 ; Hout Bay, *Pole Evans* 4395 ; Clovelly, *Penfold* 238, *Walgate* 232 ; Vlakkeberg, 2900 ft. *Schlechter* 212 ; between Fish Hoek and Simon's Town, *Arbuthnot* in Bolus Herb. 23044, *Hutchinson* 70 ; Smitswinkel Bay, *Phillips* in S. Afr. Mus. Herb. 26047, *Galpin* 12730 ; Buffels Bay, *Leighton* 967. Malmesbury Div. : Groenekloof, Oct. *Zeyher* 726 ; near Malmesbury, May, *Gill* in S. Afr. Mus. Herb. 54250 ; near Yzerfontein, July, *Esterhuysen* 3856, *Barker* 372, *Compton* (Aug.) 7399.—Paarl Div. : Joostenberg, July, *Pillans* 9862.—Riversdale Div. : Albertinia Commonage, *Muir* 611, *Stokoe* in S. Afr. Mus. Herb. 56821 ; Milkwood Fontein, *Galpin* 4043.—Stellenbosch Div.—Brakenfel, *Esterhuysen* 4053 ; Kogel Bay, May, *Parker* 3500.

2. **S. phylicoides** sp. nov. ; ramulis sparsim pubescentibus ; foliis anguste oblanceolato-linearibus obtusis glabris, supra paulum convexis, subtus obtuse carinatis ; bractea bracteolisque linearibus, dorso villosis ; tubo calycis anguste obconico villoso ; sepalis deltoideis acuminatis, dorso villosis ; petalis obovatis obtusissimis, basi villosis, margine superne dentato ; ovario anguste obconico ; stylis connatis, apice divergentibus.

About 50 cm. high, much branched, with sparsely pubescent branchlets. Leaves mostly about 7 mm. long, closely set, narrowly oblanceolate-linear, obtuse, apiculate, bluntly keeled on the dorsal surface, slightly convex on the ventral surface, glabrous, erect-spreading. Stipules minute, subulate. Flower-heads about 4 mm. wide, usually clustered at the ends of very short branchlets, surrounded and shortly overtopped by ovate-lanceolate villous or ciliate leaves. Bract and bracteoles almost as long as the flower, linear, with caducous hairs on the dorsal surface. Calyx-tube narrowly obconic, clothed with caducous hairs, adhering to the ovary throughout : calyx-lobes deltoid, acuminate, with caducous hairs on the dorsal surface, reaching to well above the middle of the petals. Petals 2·5 mm. long, obovate, very obtuse, toothed at the upper margin, persistently villous on the lower half of the ventral surface. Anthers 0·75 mm. long, oblong, reaching to well above the middle of the petals. Ovary narrowly obconic : styles connate except for the diverging tips. Fruit unknown.

Calvinia Div. : Oorlogs Kloof, about 8 miles S.S.-E. of Nieuwoudtville, c. 1900 ft. Sept. 1930, *Lavis* in Bolus Herb. 19633 (type).

The affinity is with *S. radiata* Dahl from which it is distinguished by leaves widest above the middle, and by larger toothed petals with persistent hairs on the lower half of the ventral surface.

3. **S. Dregeana** *Presl, Bot. Bemerk.* 39 (1844) ! *Dümmer in Journ. Bot.* L, suppl. 2, p. 28 (1912). **S. radiata** var. **glabra** *Sond in Harv. & Sond. Fl. Cap.* ii, 322 (1861-62). **S. capitella** *Bolus & W. Dod in Trans. S. Afr. Phil. Soc.* xiv, 264 (1903) non Sond.

Usually about 20 cm. high, much branched, compact, with sparsely villous or glabrous branchlets. Leaves mostly 6—7 mm. long, closely set, erect-spreading, slightly incurved above the middle, linear or oblong-linear, truncate or obtuse, trigonous, rather sharply keeled on the dorsal surface, usually flat and slightly keeled on the ventral surface, glabrous. Stipules minute, subulate. Flower-heads about 6 mm. wide, closely surrounded and shortly overtopped by widened whitish leaves. Bract and bracteoles slightly shorter than the flower, narrowly linear, with caducous hairs on the dorsal surface. Calyx-tube obconic, clothed with caducous hairs, adhering to the ovary throughout : calyx-lobes reaching to the upper half of the petals, subulate, villous on the dorsal surface, mostly with caducous hairs. Petals about 2·5 mm. long, ovate or elliptic, obtuse, sparsely villous on the dorsal surface. Anthers about 0·75 mm. long. Styles united throughout, reaching to the upper half of the petals. Fruit unknown.

Cape Div. : Table Mt., summit, 3500 ft. Nov. *Bolus* 4490, *Pappe* (June) in Bolus Herb. 23303, *Esterhuysen* (Oct.) 7647, *Dümmer* (fissures of rocks, Sept.) 641 ; Wynberg Caves, 2300 ft. June, *Compton* 6348.— Paarl Div. : Drakenstein Mts. 3000—4000 ft. *Drège* 6873, 6873a.

4. **S. verticillata** comb. nov. **Brunia verticillata** *Linn. f. Suppl.* 156 (1781) ; *Lam. Encycl. Meth.* i, 475 (1785) ; *Thunb. Prodr. Pl. Cap.* 41 (1794) ; *Murr. Syst. Veg.* 252 (1797) ; *Willd. Sp. Pl.* i, pars 2, p. 1142 (1798) ; *F. G. Dietr. Vollst. Lexicon Gärtn.* ii, 322 (1802) ; *Thunb. Diss. Brun.* 5 (1804) ; *Pers. Syn. Pl.* i, 246 (1805) ; *Thunb. Fl. Cap.* ed. Schultes 206 (1823) ; *DC. Prodr.* ii, 44 (1825) ; *D. Dietr. Syn. Pl.* i, 848 (1839). **Staavia nuda** *Brongn. in Ann. Sc. Nat.* viii, 379 (1826) ; *Sond. in Harv. & Sond. Fl. Cap.* ii, 322 (1861–62) ; *Dümmer in Journ. Bot.* L, suppl. 2, p. 31 (1912).

About 50 cm. high, much branched, with slender, minutely and sparsely pubescent or glabrous branchlets. Leaves mostly about 3 mm. long, imbricate, erect-spreading, linear, obtuse, apiculate, trigonous, keeled from the apex down the ventral surface, glabrous. Stipules minute, attached to the base of the petioles. Flower-heads about 3 mm.

wide, terminal, often clustered, surrounded but not exceeded by pale ciliate leaves. Bract and bracteoles alike, setiform, clothed with caducous hairs. Calyx-tube narrowly obconic, with caducous hairs, free in the upper cup-shaped part: calyx-lobes linear-lanceolate, with caducous hairs on the dorsal surface, reaching to the middle of the petals. Petals about 1·5 mm. long, obovate, glabrous, with a median keel on the ventral surface. Anthers elliptic. Ovary with persistent hairs on the summit: styles connate except at the tips. Fruit dehiscing down two sides, 1-seeded.

Caledon Div.: River Zonder Einde, near the farm "Linde", Sept. *Ecklon & Zeyher* 1066.—Paarl Div.: Du Toit's Kloof, 3000—4000 ft. Oct.–Jan. *Drège* in S. Afr. Mus. Herb. 15800, in Nat. Herb. Pretoria 12093.—Worcester Div.: near Bain's Kloof, Zuurvlakte, 3000 ft. Sept. *Primos* in Marl. Herb. 11668.

5. **S. comosa** *Colozza in Ann. di Bot. Roma* ii, 22, 35, tab. 1 (1905). **Brunia comosa** *Thunb. in Hoffm. Phytog. Bl.* 1, 17 (1803); ej. *Diss. Brun.* 5 (1804); ej. *Fl. Cap.* ed. Schultes 205 (1823); *DC. Prodr.* ii, 44 (1825); *D. Dietr. Syn. Pl.* i, 848 (1839). **Brunia capitella** *Thunb. Diss. Brun.* 5 (1804); ej. *Fl. Cap.* ed. Schultes 206 (1823); *DC. Prodr.* ii, 44 (1825). **Staavia adenandraefolia** *Ecklon & Zeyher, Enum. Pl.* 141 (1835). **S. rupestris** *Ecklon & Zeyher* l.c.! absque descr.; *Dietr. Fl. Univ. N. Folge* tab. 51 (1849). **S. nuda** *Ecklon & Zeyher* l.c. non Brongn. **Brunia Dregeana** *Presl. Bot. Bemerk.* 39 (1844) nomen. **S. capitella** *Sond. in Harv. & Sond. Fl. Cap.* ii, 323 (1861–62) incl. var.; *Colozza in Ann. di Bot. Roma* ii, 23 (1905); *Dümmer in Journ. Bot.* L, suppl. 2, p. 30 (1912).

Usually 60—80 cm. high, much branched, with villous branchlets. Leaves mostly 5—8 mm. long, closely set, erect-spreading or spreading, lanceolate, obtuse, apiculate, convex and bluntly keeled on the dorsal surface, slightly convex on the ventral surface, occasionally somewhat concave below the middle, conspicuously ciliate, becoming glabrous. Stipules minute, subulate. Flower-heads about 4 mm. wide, often clustered at the ends of the branchlets, surrounded by involucral leaves, the inner of which are 3·5—4·5 mm. long, linear or linear-oblong, obtuse, ciliate on the lower half, and shortly exceeding the flowers. Bract and bracteoles acicular, almost as long as the flower, with caducous hairs on the dorsal surface. Calyx-tube obconic, clothed with caducous unicellular hairs, with a free cup-shaped upper part: calyx-lobes lanceolate, reaching to well above the middle of the petals, with caducous hairs on the dorsal surface or glabrous. Petals scarcely 2·5 mm. long, ovate-elliptic or obovate-elliptic, very obtuse, persistently pilose on the dorsal surface. Anthers ovate. Ovary almost entirely inferior; styles

connate throughout, reaching to well above the middle of the petals. Fruit unknown.

Bredasdorp Div. : hills at Jan Zwart's Kraal, near Elim, Oct. *Bodkin* in Bolus Herb. 6906, 6907 ; mountain near Bredasdorp, *Galpin* 11288.—Caledon Div. : Houwhoek, *Ecklon & Zeyher* 1078, *Schlechter* 5460, 9391, *Bolus* (July) in Natal Herb. 2554, in Wood's Herb. 3792, in Herb. Norm. Austr.-Afr. 1155 ; Zwartberg, Aug. *Ecklon & Zeyher* 1077, 1079, *Zeyher* (Sept.) 2647, *Bodkin* in Bolus Herb. 9218 ; Hemel en Aarde, *Pappe* in S. Afr. Mus. Herb. sub. 36300 ; mountains near Villiersdorp, c. 2200 ft. Nov. *Bolus* 5049 ; Klein River Mts. *Stokoe* 6014a ; Nieuweberg, Sept. *Stokoe* 3183 ; Kaaimansgat, May, *Esterhuysen* 1886.

6. **S. trichotoma** comb. nov. **Phylica trichotoma** *Thunb. Prodr. Cap.* 187 (1794) ; ej. *Fl. Cap.* ed. Schultes 201 (1823) ; *DC. Prodr.* ii, 37 (1825) ; *Spreng. Syst. Veg.* i, 827 (1825). **Phylica globosa** *Thunb. Diss.* 8 (1804) ; ej. *Fl. Cap.* ed. Schultes 205 ; *DC. Prodr.* ii, 37 ; *Spreng. Syst. Veg.* i, 828. **Phylica elongata** *Willd. ex Roem. & Schultes, Syst. Veg.* v, 491 (1819) ; *DC. Prodr.* ii, 37 (1825). **Staavia globosa** *Sond. in Harv. & Sond. Fl. Cap.* ii, 322 (1861-62) ; *Dümmer* in *Journ. Bot. suppl.* 2, p. 31 (1912) excl. S. ciliata. **Staavia lateriflora** *Colozza in Nuov. Giorn. Bot. Ital.* x, 397 (1903) ; *in Ann. di Bot. Roma* ii, 24, 36, tab. ii (1905).

Usually about 50 cm. high, much branched, with shortly pubescent branchlets. Leaves mostly about 6 mm. long, erect-spreading, very slightly incurved, lanceolate or ovate-lanceolate, very obtuse, at first apiculate, convex and bluntly keeled on the dorsal surface, flat or slightly concave on the ventral surface, at first pilose on the margins, becoming glabrous. Stipules minute, subulate. Flower-heads about 8 mm. wide, terminal, solitary, involucred by pale leaves shortly over-topping the flowers. Bract and bracteoles alike, linear, apiculate, with caducous unicellular hairs on the dorsal surface, reaching nearly to the tips of the petals. Calyx-tube narrowly obconic, clothed with caducous hairs, with a narrow free upper margin : calyx-lobes subulate, apiculate, with caducous hairs on the dorsal surface. Petals about 2 mm. long, elliptic, obtuse, clothed with caducous hairs on the dorsal surface. Anthers slightly more than 0·5 mm. long, ovate. Ovary with persistent hairs on the summit : styles connate except at the tips. Fruit unknown.

Caledon Div. : Kaaimans Gat, May, *Compton* 8806 ; Genadendal Mts. *Schlechter* 9842, *Stokoe* (Oct.) 2501 ; Villiersdorp, Oct. *de Villiers* in Nat. Bot. Gdns. S. Afr. 1927/30 ; Wildepaardeberg, Oct. *Stokoe* 2740.—Worcester Div. : Bosjesveld Mts. 4000 ft. *Stokoe* 7328.

7. **S. Zeyheri** *Sond. in Harv. & Sond. Fl. Cap.* ii, 323 (1861–62) ! *Dümmer in Journ. Bot.* l, suppl. 2, p. 31 (1912).

About 90 cm. high, moderately branched, with wiry villous branchlets.

Leaves mostly 1·3—1·5 cm. long, including the petiole (2 mm. in length), closely set, erect-spreading, linear-lanceolate, somewhat acuminate, subacute, acutely convex on the dorsal surface, concave on the ventral surface, at first ciliate, soon becoming glabrous. Stipules absent. Flower-heads 3—4 mm. wide, rotund, involucred, 5—7-flowered, axillary, sessile, crowded in rotund groups of 8—24 at the ends of branches : involucral leaves considerably overtopping the flowers, mostly 4—8 mm. long, linear-oblong in the lower half, attenuate upwards, obtuse, coriaceous, ciliate in the lower half, whitish, slightly spreading from the middle, the outer about half as long as the inner which serve as bracts. Bracteoles 2, reaching to shortly above the middle of the flower, acicular, with long caducous hairs on the dorsal surface. Calyx-tube turbinate, clothed with long caducous hairs, adhering to the ovary except for a narrow upper margin : calyx-lobes lanceolate, subulate-acuminate, with caducous hairs on the dorsal surface, reaching to well above the middle of the petals. Petals about 2·5 mm. long, oblong, very obtuse, villous on the upper half of the dorsal surface. Anthers oblong, reaching to well above the middle of the petals. Styles connate throughout, reaching the upper half of the petals. Fruit 1- or 2-seeded : seeds elliptic, smooth, black.

Caledon Div. : River Zonder Einde Mts. near Appels Kraal, rocky places, Sept. *Zeyher* 2648. *Stokoe* (lower eastern slopes, 1500 ft. Oct.) 9273. in S. Afr. Mus. Herb. 56789.

The arrangement of the flower-heads is unlike that in any other species in the genus, and may be compared to the arrangement in *Nebelia fragarioides* O. Kze.

8. **S. glutinosa** *Dahl, Obs. Bot.* 17 (1787) ; *Thunb. Nov. Gen.* vii, III (1792) ; ej. *Prodr. Pl. Cap.* 41 (1794) ; *Murr. Syst. Veg.* 252 (1797) ; *Willd. Sp. Pl.* i, pars 2, p. 1144 (1798) ; *Pers. Syn. Pl.* i, 246 (1805) ; *Wendl. Coll. Pl.* 66, tab. 22 (1805) ; *Willd. in Denk ch Akad. Moench.* 134 (1809) ; *Aiton Hort. Kew.* ed. 2, ii, 35 (1811) ; *Thunb. Fl. Cap.* ed. Schultes 207 (1823) ; *Lodd. Bot. Cab.* ix, tab. 852 (1824) ; *DC. Prodr.* ii, 45 (1825) ; *Spreng. Syst. Veg.* i, 781 (1825) ; *Brongn. in Ann. Sc. Nat.* viii, 379 (1826) ; *Sond. in Harv. & Sond. Fl. Cap.* ii, 322 (1861–62) ; *Marloth in Deutsch. Tiefsee-Exped.* ii, III, 158 (1908) ; *Dümmer in Journ. Bot.* L, suppl. 2, p. 27 (1912) ; *Stoneman, Plants and Their Ways in S. Afr.* ed. 2, pp. 284, 307 (1915) ; *Marloth, Fl. S. Afr.* ii, § 1, p. 39 (1925) ; *Verdoorn in Fl. Pl. S. Afr.* xxiv, tab. 927 (1944). **Brunia glutinosa** *Berg. Descr. Pl. Cap.* 57 (1767) ; *Linn. Mant.* ii, 210 (1767) ; *Linn. Syst. Veg.* ed. 14, p. 240 (1784) ; *Lam. Encycl. Meth.* i, 475 sub sp. 8 (1785) ; *Richter, Syst.* 217 (1840). **Brunia coronata** *Linn. Mant.* ii, 210 in syn. **Brunia colorata**

*Houttuyn, Linn. Pl. Kruid Kund.* vi, 333 in syn. (1775); *Richter, Syst.* 217.

**Staavia glaucescens** *E. Mey in Drège, Zwei Pfl. Doc.* 223 (1844) nomen.

Usually about 75 cm. high, normally much branched, with sparsely pilose branchlets. Leaves closely set, erect-spreading, mostly 1—1·5 cm. long, linear, acute or obtuse, apiculate, sharply keeled on the dorsal surface, deeply furrowed on the ventral surface except at the apex, v-shaped in cross section, sparsely pilose, becoming glabrous. Stipules minute, subulate. Flower-heads terminal, most by about 8 mm. wide, involucred by elongated whitish leaves. Bract and bracteoles acicular, villous, viscid. Calyx-tube obconic, viscid, clothed with unicellular hairs : calyx-lobes subulate, villous on the dorsal surface, reaching to near the tips of the petals. Petals about 2·5 mm. long, oblong, slightly widened above the middle, obtuse, viscid. Anthers about 0·75 mm. long, oblong. Styles connate except at the tips. Fruit containing 1 elliptic longitudinally ridged seed.

Cape Div. : Table Mt. April—Oct. *Ecklon & Zeyher* 1074, *Bodkin* in Bolus Herb. 4579, *A. Bolus* in Bolus Herb. 4579 *a*, *Marloth* 122, *Phillips* 261 ; east slopes of Table Mt. c. 2800 ft. *Bolus* 4579 ; summit of Table Mt. *Pappe* in S. Afr. Mus. Herb. 37690, *Barnard* in S. Afr. Mus. Herb. 54913, *Thode* A11, A102 ; lower plateau of Table Mt. *W. Dod* 1689, *Pillans* 3682 ; Nursery Gorge, Aug. *Compton* 7674, 9239 ; Groot Kop, 2500 ft. Febr. *Esterhuysen* 11406 ; Disa Gorge, *Andreae* 1122 ; Muizenberg, summit, June, *Zeyher*.—Uitenhage Div.: Van Staaden's Gorge, July, Aug. *Hallack* in Galpin Herb. 3008. [A very remarkable record.]

9. **S. Brownii** *Dümmer in Journ. Bot.* L, suppl. 2, p. 28 (1912).

About 50 cm. high, moderately branched, with pilose branchlets. Leaves closely set, mostly 0·7—1 cm. long, erect-spreading, almost straight, lanceolate, subacute or truncate, keeled on the dorsal surface, flat or slightly furrowed on the ventral surface, sparsely ciliate, becoming glabrous. Stipules minute, subulate. Flower-heads about 6 mm. wide, surrounded and shortly overtopped by an involucre of considerably widened oblanceolate whitish leaves usually 6—7 mm. long. Bract spathulate, villous on both surfaces, shortly exceeding the flower. Bracteoles narrowly spathulate, villous, about as long as the flower. Calyx-tube narrowly obconic, ridged longitudinally, clothed with long caducous hairs, with a shallow cup-shaped upper part : calyx-lobes lanceolate, acuminate, densely villous on the dorsal surface, reaching the tips of the petals. Petals about 2·75 mm. long, oblong lanceolate, obtuse, glabrous or pilose on the upper half of the dorsal surface, slightly concave on the ventral surface. Anthers slightly more than 0·5 mm. long, ovate. Styles connate throughout, reaching the middle of the petals. Seeds with a cup-shaped aril.

South Africa : without precise locality, in S. Afr. Mus. Herb. [This specimen was a portion of the material cited by Dümmer as being in the Kew Herb.].—Caledon Div. : slopes near the mouth of the Steenbras River, Febr. *Levyns* 4954.

10. **S. Dodii** *Bolus in Hook. Ic. Pl.* xxvi, tab. 2558 (1898) ; *Dümmer in Journ. Bot.* L, suppl. 2, p. 28 (1912) ; *Marloth, Fl. S. Afr.* 11, § 1, p. 36, fig. 20 (1925).

Usually about 60 cm. high, moderately branched, with villous branchlets. Leaves mostly 0·6—1 cm. long, closely set, erect-spreading, oblong, very obtuse, retuse, flat, slightly keeled on the dorsal surface, ciliate, becoming glabrous. Stipules almost entirely adnate to the base of the petiole. Flower-heads mostly 1—1·2 cm. wide, terminal and solitary, involucred by enlarged whitish leaves much overtopping the flowers. Bract and bracteoles almost as long as the flowers, linear-spathulate, apiculate, ciliate. Flowers agglutinate with a resinous substance. Calyx-tube narrowly obconic, ridged longitudinally, pilose, with a narrow free upper margin : calyx-lobes lanceolate, acuminate, ciliate, viscid, almost as long as the petals. Petals about 3 mm. long, elliptic-oblong, obtuse, pilose on upper half of the dorsal surface. Anthers ovate, about 0·75 mm. long. Styles connate throughout. Fruit containing 1 rotund seed.

Cape Div. : near Smitswinkel Bay, Rooihoogte, June—Sept. *W. Dod* (June, 1897) 2641 [Type in Bolus Herb.] *Bodkin* in Bolus Herb. 7988, *Leighton* in Bolus Herb. 23043 ; hills at " Brightwater ", May, *Compton* 14554 ; between Smitswinkel Bay and Sirkels Vlei, *Galpin* 12262, 12270 ; Cape Point Reserve, April, *Goulimis* in Bolus Herb. 23042.

### Imperfectly Known Species.

**S. ciliata** *Brongn. in Ann. Sc. Nat.* viii, 380 (182). Sonder and Dümmer united this species with *S. globosa* Sond.

XI. BRUNIA *Linn.* [*Syst.* ed. 1 (1735) ; *Gen. Pl.* ed. 1, p. 61 (1737) excl. syn. Boerh.] *Gen. Pl.* ed. 4, p. 92 (1754) ; *Lam. Encycl. Meth.* i, 474 (1785) ; *Gaertn. Fruct. & Sem. Pl.* i, 152 (1788) ; *Aiton, Hort. Kew.* 1, 276 (1789) ; *Linn. Syst. Veg.* ed. 15, p. 251 (1797); *Willd. Sp. Pl.* i, pars 2, p. 1141 (1798); *Thunb. Diss. Brun.* 2 (1804); *Pers. Syn. Pl.* i, 246 (1805); *Aiton, Hort. Kew*, ed. 2, ii, 34 (1811): *Thunb. Fl. Cap.* ed. Schultes 204 (1823): *DC. Prodr.* ii, 43 (1825); *Brongn. in Ann. Sc. Nat.* viii, 372 (1826) partim ; *Harv. Gen. S. Afr. Pl.* ed. 1, p. 126 (1838); *Endl. Gen.* 806, no. 4597 (1839) partim ; *Richter, Syst.* 216 (1840): *Sond. in Harv. & Sond. Fl. Cap.* ii, 313 (1861-62); *Benth. & Hook. f. Gen. Pl.* i, 671 (1865) partim ;

*Lindley, Treasury of Bot.* i, 174 (1870); *Nieden. in Engl. & Prantl, Pflanzenfam.* iii, 2a, 136 (1891); *Henslow, S. Afr. Fl. Pl.* 142 (1903); *Thonner, Fl. Pl. Afr.* 237 (1915); *Marloth, Fl. S. Afr.* ii, §1, pp. 37, 38 (1925); *Phillips, Gen. S. Afr. Fl. Pl.* 291 (1926); *Levyns, Guide to Fl. Cape Peninsula* 138 (1929).

Much branched shrubs or undershrubs with ascending branches. Leaves closely set or imbricate, sessile or petiolate, lanceolate, lanceolate-linear or oblong, carinate on one or both surfaces or tetragonal, pubescent, sparsely villous, pilose or merely ciliate. Stipules present or absent, minute, subulate. Flowers small, subtended by a bract and, rarely, by 2 bracteoles, crowded in globose or rotund heads. Calyx-tube obconic, villous, clothed with caducous unicellular hairs or glabrous, adhering entirely to the ovary: calyx-lobes acicular, linear, linear-oblanceolate or ovate, villous on the dorsal surface or merely sparsely ciliate. Petals free, spathulate-linear, oblong, elliptic or oblanceolate, tapering towards the base, glabrous or minutely pubescent on the lower half or at the middle of the ventral surface. Stamens exserted, ± unequal: anthers linear, oblong or ovate: thecae free in the lower half. Ovary $\frac{1}{2}$—$\frac{3}{4}$ inferior, conical, or rounded in the upper part, villous, sparsely pilose or glabrous, imperfectly bilocular: loculi uni- or biovulate: styles 2, free, slender, exserted: stigmas minute. Fruit (imperfectly known) 1- or 2-seeded, dehiscent: seeds elliptic or ovate, wrinkled.

Named in honour of Dr. Alexander Brown, surgeon in the East Indies.

KEY TO THE SPECIES.

Leaves widest at or above the middle:
- Leaves soon becoming glabrous on the dorsal surface .. (2) *neglecta*
- Leaves persistently puberulous on the dorsal surface:
  - Flowering heads 2·5—3 cm. wide .. .. .. .. (4) *macrocephala*
  - Flowering heads 1·5—2 cm. wide .. .. .. .. (3) *laevis*

Leaves widest below the middle:
- Flowering heads rotund, 0·3—0·4 cm. wide .. .. .. (7) *alopecuroides*
- Flowering heads sphaeroid, exceeding 1 cm. in diameter:
  - Leaves sessile, 2—3 mm. long .. .. .. .. (1) *nodiflora*
  - Leaves petiolate, at least 5 mm. in length:
    - Leaves glabrous, with a prominent median vein on the ventral surface; anthers oblong; ovary villous on the upper half .. .. .. .. .. (5) *Stokoei*
    - Leaves pilose, furrowed on the ventral surface; anthers linear; ovary glabrous on the upper half.. .. (6) *albiflora*

1. **B. nodiflora** *Linn. Sp. Pl.* i, 199 (1753); *Berg. Descr. Pl. Cap.* 54 (1767); *Linn. Mant. altera* 343 (1771); *Lam. Encycl. Meth.* i, 474 (1785); *Gaertn. Fruct.* i, 152, tab. 3, fig. 10 (1788); *Aiton, Hort. Kew.* i, 276 (1789); *Thunb. Prodr. Pl. Cap.* 41 (1794); *Lam. Illus.* i, tab. 126 (1797); *Linn. Syst. Veg.* ed. 15, p. 251 (1797); *Willd. Sp. Pl.* 1, pars 2, p. 1141 (1798); *F. G. Dietr. Vollst. Lexicon Gärtn.* ii, 321 (1802); *Thunb. Diss. Brun.* 2

(1804); *Pers. Syn. Pl.* i, 246 (1805); *Wendl. Collect.* tab. 35 (1805); *Aiton, Hort. Kew.* ed. 2, ii, 34 (1811); *Roem. & Schultes, Syst. Veg.* v, 409 (1819); *Thunb. Fl. Cap.* ed. Schultes 205 (1823); *DC. Prodr.* ii, 43 (1825); *Linn. Syst. Veg.* ed. 16, p. 782 (1825) excl. syn. ; *Brongn. in Ann. Sc. Nat.* viii, 373, tab. 36, fig. 1 (1826); *Ecklon & Zeyher, Enum.* 139 (1835) incl. vars ; *D. Dietr. Syn. Pl.* 1, 848 (1839); *Richter, Syst.* 217 (1840); *Schnizlein, Iconogr.* iii, tab. 168, figs. 23, 24 (1843–70); *Lindley, Veg. Kingdom*, ed. 3, p. 785 (1853); *Sond. in Harv. & Sond. Fl. Cap.* ii, 313 (1861–62); *Nicholson, Illustr. Dict. Gard.* i, 216, fig. 284 (1884); *Nieden. in Engl. & Prantl, Pflanzenfam.* iii, 2a, 132, figs. A-G (1891); *Henslow, S. Afr. Fl. Pl.* 141 (1903); *Marloth in Deutsch. Tiefsee-Exped.* 1898–99, ii, pp. 111, 121, tab. 5 (1908); *Engler & Drude, Veget. Erde* ix, 1, 2, p. 487, figs. A-G (1910) ; *Dümmer in Journ. Bot.* L, suppl. 2, p. 12 (1912); *Marloth, Fl. S. Afr.* ii, § 1, p. 38, tab. 13, fig. A, tab. 14 (1925); *Hutchinson, Botanist in S. Afr.* 46 (1946). [**Cupresso pinulus Capitis Bonae Spei** *Breyn. Cent.* 22, tab. 10 (1678). **Erica florulentis capitulis alba noduligera** *Breyn. Cent.* 179 (1678). **Scabiosae affinis arbuscula africana ericoides sphaerocephalos** *Ray. Hist. Pl.* 1444 (1686). **Levisanus Capensis juniperi Bermudiani folio** *Petiver, Mus. Pet.* cent. 8, p. 75 (1695). **Eupatorium ericoides Capitis Bonae Spei** *Morison, Pl. Hist.* 3, § 7, p. 97, tab. 8, fig. 10 (1699). **Brunia foliis quadrifariam imbricatis** *Linn. Hort. Cliff.* 71 (1737) ; *Royen, Lugd. Bat.* 191 (1740); *Wachendorff, Horti Ultra.* 202 (1747). **Cupressus pinulis** *Weinm. Phytanth. Icon.* ii, 297, tab. 448, fig. d (1737-45). **Brunia foliis imbricatis triquetris acutis** *Linn. Syst. Veg.* ed. 12, p. 240 (1767). **Erica capitata, seu nodiflora, compressiformis africana** *Pluk. Mant.* 69, tab. 346, fig. 4 (1769).]

Usually 60—90 cm. high, with minutely pubescent branchlets. Leaves 2—3 mm. long, sessile, imbricate, shortly decurrent, erect-spreading, ascending or slightly incurved, lanceolate, obtuse, tetragonal, smooth, glabrous except for hairs at the apex while young. Stipules absent. Flower-heads about 1 cm. wide, globose, involucred at the base by villous slightly modified leaves, usually crowded in panicle-like groups. Bract spathulate, villous, incurved, reaching the tips of the petals. Calyx-tube narrowly obconic, densely villous : calyx-lobes spaced at the base, 2—2·5 mm. long, linear-lanceolate, densely villous. Petals about 3 mm. long, oblanceolate, glabrous, cream-coloured, recurved over the tips of the calyx-lobes, with 2 wing-like decurrent keels at the middle. Stamens much exserted : filaments unequal in length (the shortest on the adaxial side of the flower): anthers 1 mm. long, oblong, with the thecae free in the lower half. Ovary $\frac{1}{2}$ inferior, villous, with 2 biovulate chambers (the inner edges of the placentas in close contact): ovules pendulous, at even height : styles shorter than the petals. Fruit unknown.

Caledon Div.: Sir Lowry's Pass, *Schlechter* 4806, *Galpin* 3509; Elgin, *Smith* 2577; Stettynsberg, 3000 ft. *Esterhuysen* 11144; Houwhoek, April, *Schlechter* 7582; near Genadendal, top of Baviaans Kloof, *Stokoe* 6011; Kaaimans Gat, *Compton* 8801, *Esterhuysen* (May) 1894; River Zonder Einde Mts., Happy Valley, April, *Barker* 971.—Cape Div.: Table Mt. and Devil's Peak, April, May, *Ecklon & Zeyher* 1062, *Drège* in S. Afr. Mus. Herb. 37686, *Marloth* in Nat. Herb. Pretoria 4794; below Kloof Corner, 1000 ft. June, *Esterhuysen* 10177; Lion's Head, *Pappe* in S. Afr. Mus. Herb. 15971; Kirstenbosch, July, *Esterhuysen* 257; Orange Kloof, *J. C. Smuts* 1078, *Bolus* (Nov.) 7299, *Hutchinson* (Aug.) 47; Camp's Bay, *Marloth* 151, *Thode* A101; near Cape Town, *Tyson* 2433, in Wood Herb. 3350.—Ceres Div.: between Witsenberg and Skurfdeberg, "Rosendalfontein," *Pillans* 9590; Ceres, Febr. *Rogers* 17600.—Knysna Div.: Groot River Pass, 700 ft. May, *Fourcade* 149; Concordia, *Keet* 719, in Forest Dept. Herb. 2763, *Kapp* 88; Clarkson, Aug. *Thode* A835.—Ladismith Div.: Seven Weeks Poort, July, *Marloth* 2983, *Phillips* (4000—5000 ft.) 1440.—Mossel Bay Div.: Cloete's Pass, May, *Muir* 2151.—Oudtshoorn Div.: Great Zwartberg, slopes below the pass, 4000—5000 ft. *Pocock* S15, S228.—Paarl Div.: between Bailey's Peak and Pic Blanc, *Esterhuysen* 1650; French Hoek Forest Reserve, *Leighton* 1005; near Salem, summit of Klein Drakenstein Mts., *Galpin* 10615; Bain's Kloof, April, *Marloth* 12027; top of French Hoek Pass, 3000 ft. May, *Esterhuysen* 11597.—Piquetberg Div.: Kapiteins Kloof Mt., *Pillans* 7845; Mouton's Vlei, *Pillans* 7343.—Tulbagh Div.: Great Winterhoek, Snecuwgat Valley, 3500 ft. April, *Phillips* 1739.—Uitenhage Div.: Van Staadensberg, May, June, *Zeyher* 497, 2639, *Long* 593; Cockscomb Mt., *Whitworth* in Bolus Herb. 23035.—Uniondale Div.: Lauterwater, 3000 ft. *Compton* 4210; Assegai Bosch, 600 ft. *Britten* 1240, *West* (May) 259; between Avontuur and Knysna, *Fries, Norlindh and Weimarck* 1607; Helpmekaar Peak, *Esterhuysen* 4567; Kamanassie Mts., Mannetjieberg, *Esterhuysen* 4754; Outeniqua Mts., Die Hoek Valley, *Esterhuysen* 10667; Kouga Mts., near Kouga Peak, 3000—4000 ft. *Esterhuysen* 10808; near Smutsberg, 4000 ft. *Esterhuysen* 10746.—Worcester Div.: Du Toit's Kloof, *Esterhuysen* 9690; Waaihoek Mts., Chavonnesberg, March, *Galpin* 12756, *Esterhuysen* 8989; Witte River Valley, *Thorne* in S. Afr. Mus. Herb. 46533; Wildepaardeberg, April, *Stokoe* in Bolus Herb. 17500, *Andreae* 335; without precise locality, *Cooper* 1591, in Natal Herb. 8303.

There is a record of this species being represented in Morison's herbarium in Oxford. This material is probably a portion of the collecting made by Alexander Brown at the Cape.

2. **B. neglecta** *Schltr. in Engl. Bot. Jahrb.* xxiv, 443 (1897)!

About 60 cm. high, with puberulous branchlets. Leaves 3—5 mm. long, sessile, imbricate, oblanceolate-linear, obtuse, incurved, convex on the dorsal surface, bisulcate on the ventral surface, glabrous except for ciliation. Flower-heads about 1·5 cm. wide, globose, involucred by densely villous modified leaves at the base. Bract linear-spathulate, densely villous on the dorsal surface. Calyx-tube narrowly obconic, densely villous : calyx-lobes spaced at the base, acicular, densely villous on the dorsal surface. Petals about 4 mm. long, oblanceolate-linear, obtuse, glabrous, cream-coloured, spreading over the tips of the calyx-lobes, with 2 decurrent wing-like keels at the middle. Stamens much exserted : filaments slightly unequal in length (2 adaxial shorter than the others); anthers 1 mm. long, oblong : thecae free almost $\frac{2}{3}$ of their length. Ovary almost entirely inferior, villous at the apex, with 2 imperfectly formed biovulate chambers : placentas with the inner edges united in the lower half, free in the upper : ovules collateral, pendulous. Fruit unknown.

Caledon Div. : Sir Lowry's Pass, 1000 ft. Jan. *Schlechter* 7297 ; Elgin, *Smith* 2576 ; Viljoen's Pass, Dec. *Rogers* 28933 ; Babylon's Tower, south-east slopes, Febr. *Esterhuysen* 4959.—Stellenbosch Div. : Guardian Peak, *Esterhuysen* 11980 ; Hottentots Holland Mts., near Diep Gat Ravine, Jan. *Esterhuysen* 12519a.—Worcester Div. : Bosjesveld Mts. 4500 ft. Febr. *Stokoe* 7330.

3. **B. laevis** *Thunb. Prodr. Pl. Cap.* 187 (1800) ; ej. *Diss. Brun.* pp. 2, 3 (1804); *Pers. Syn. Pl.* i, 246 (1805); *Lam. Encycl.* suppl. i, 712 (1810) ; *Thunb. Fl. Cap.* ed. Schultes 204 (1823) ; *DC. Prodr.* ii, 43 (1825) ; *Sond. in Harv. & Sond. Fl. Cap.* ii, 314 (1861–62) ; *Dümmer in Journ. Bot.* L, suppl. 2, p. 12 (1912) excl. syn. B. neglecta. **B. globosa** *Ecklon & Zeyher, Enum.* 139 (1835) absque descr. non Thunb. ; *E. Mey in Drège, Zwei Pfl. Doc.* 169 (1844) nomen. **B. superba** *Krauss ex Sond. in Harv. & Sond. Fl. Cap.* ii, 314.

Usually 60—90 cm. high, with puberulous branchlets. Leaves 3—5 mm. long, sessile, imbricate, linear-oblong or oblanceolate-oblong, obtuse, convex on the dorsal surface, almost flat on the ventral surface, slightly incurved, entirely puberulous. Flower-heads about 1·5 cm. wide, globose, involucred by acute tomentose modified leaves. Bract spathulate, acute, densely villous on the dorsal surface, less so on the ventral side of the apex, incurved, reaching the tips of the petals. Calyx-tube narrowly obconic, densely villous : calyx-lobes spaced at the base, narrowly linear, villous on the dorsal surface. Petals about 5 mm. long, spathulate-linear, obtuse, glabrous, cream-coloured, spreading over the tips of the calyx-lobes, with 2 decurrent wing-line keels on the upper half of the ventral surface. Stamens much exserted : filaments unequal

in length (the shortest being adaxial) : anthers scarcely 1·5 mm. long, oblong, obtuse : thecae free slightly more than ½ their length. Ovary ½ inferior, densely villous, with 2 imperfectly formed biovulate chambers (the inner edges of the placentas united in the lower half, adjacent in the upper half) : ovules collateral, pendulous, styles villous on the lower half. Fruit unknown.

Bredasdorp Div. : flats on south side of mountain range near the road to Elim, Dec. *Galpin* 11359 ; upper slopes of mountain near Bredasdorp, *Galpin* 10494, 11242, *Hafstrom & Acocks* (Dec.) 2132 ; between Elim and the Poort, *L. Bolus* in Bolus Herb. 20536.—Caledon Div. : near Genadendal, Baviaansberg, *Pappe* in S. Afr. Mus. Herb. 15793 partly ; hills at Klein River, Aug. *Zeyher* 2640 ; Zwartberg, April, *Pappe* in S.A. Mus. Herb. 15793, *Guthrie* 3571, *Galpin* 4038, *Bolus* (Jan.) 7387 ; Hermanus, 2000 ft. Dec. *Compton* 14250, *Leighton* 352 ; Zondags Kloof, Bond 770, *Walgate* (Dec.) 81 ; Houwhoek 900—1500 ft. Febr. *Schlechter* 7331, *Bolus* 5349; Babylons Tower, south-east slopes, Febr. *Esterhuysen* 4969 ; Danger Point Mt. 1170 ft. Jan. *Leighton* 1578.

4. **B. macrocephala** *Willd. in Denkschr. Acad. Muench* i, 132, tab. 6, fig. 1 (1808) ; *DC. Prodr.* ii, 44 (1825) ; *Spreng. Syst. Veg.* i, 782 (1825) ; *Sond. in Harv. & Sond. Fl. Cap.* ii, 314 (1861-62) ; *Dümmer in Journ. Bot.* L, suppl. 2, p. 13 (1912). **B. Marlothii** *Schltr. in Journ. Bot.* xxxv, 280 (1897) ! *Dümmer l.c.* ; *Hutchinson, Botanist in S. Afr.* 121 (1946).

About 60 cm. high, with densely puberulous branchlets. Leaves mostly 0·7—1 cm. long, imbricate, oblanceolate-linear, subacute, erect-spreading, incurved, convex on the dorsal surface, bisulcate on the ventral surface, densely and shortly pubescent on both surfaces, villous-ciliate. Flower-heads about 2·5 cm. wide, globose, involucred by lanceolate leaves. Bract lanceolate, subacute, attenuate at the base, mostly pubescent on both surfaces, villous-ciliate, densely villous at the base, reaching to near the tips of the petals. Calyx-tube narrowly obconic, densely villous : calyx-lobes spaced at the base, 3—4 mm. long, acicular, densely villous on the dorsal surface. Petals about 5 mm. long, acicular, widened above the middle into an elliptic obtuse lamina at the base of which arise 2 long-decurrent wing-like keels, glabrous. Stamens much exserted : filaments unequal in length (one much shorter than the others); anthers 2 mm. long, linear-oblong ; thecae free ½ their length. Ovary almost entirely inferior, villous on the upper part, with 2 imperfectly formed biovulate chambers (placentas with the inner edges united in the lower half, free in the upper half): ovules at even height, pendulous : styles villous at the base. Fruit unknown.

Worcester Div. : Hex River Mts., Keeromsberg, Sept. *Barnard* in S. Afr. Mus. Herb. 48739 ; Matroosberg, 3500 ft. Jan. *A. Bolus* in Bolus

Herb. 6364, *Marloth* 1998, 2353 ; Kavadouws Mts., plateau, 4000—5000 ft. *Esterhuysen* 10352 ; without precise locality, *Hutchinson* 631.

5. **B. Stokoei** *Phillips in Kew Bull.* 1922, p. 195 ! *in Fl. S. Afr.* iii, tab. 92 (1923).

About 1 ·5 m. high, rigid, with glabrous branchlets. Leaves mostly 0 ·8—1 cm. long, very closely set, shortly petiolate, erect-spreading, lanceolate-linear, truncate, dorsally compressed, with a prominent median vein on both surfaces, glabrous or with a few long hairs on the dorsal surface. Stipules subulate, ustulate, shorter than the petiole. Flower-heads about 1 ·5 cm. wide, globose, involucred by scale-like ciliate leaves, usually clustered in corymb-like groups. Bract spathulate, densely villous on the dorsal surface, slightly overtopping the calyx-lobes. Calyx-tube obconic, slightly compressed, densely villous : calyx-lobes about 4 mm. long, spaced at the base, linear, densely villous on the dorsal surface, with an acuminate deciduous apex. Petals about 6 mm. long, linear-oblong, tapering towards the base, slightly widened and rounded at the apex, often emarginate, red, with 2 wing-like keels on the upper half extending almost to the base. Stamens much exserted : filaments almost equal : anthers 1 ·25 mm. long, oblong : thecae free in the lower half. Ovary ½ inferior, villous, with 2 imperfectly formed uniovulate chambers (inner edges of placentas free, adjacent) : styles villous at the base. Fruit mostly sterile, 2-seeded : seeds ovate.

Caledon Div. : Hottentots Holland Mts., Febr. *Stokoe* in S. Afr. Mus. Herb. 25877 ; mountains near Platteberg, 2000 ft. April, 1922, *Stokoe* 408 ; Palmiet River Mts., *Barnard* in S. Afr. Mus. Herb. 40465 ; mountains near Bot River Mouth, Paardeberg, April, *Marloth* 8376 ; near Kogelberg, *Stokoe* 440, in Bolus Herb. 23037, in Nat. Herb. Pretoria 1668 ; near Palmiet River Mouth, Jan. *Stokoe* in Bolus Herb. 23038 ; west end of Buffels Mt., *Pillans* 8240.

6. **B. albiflora** *Phillips in Kew Bull.* 1922, p. 195 ! *Dyer in Fl. Pl. S. Afr.* xxiv, tab. 928 (1944). **Berzelia Rogersii** *N.E. Br. in Kew Bull.* 1931, p. 449 !

Usually 2—3 m. high, with villous branchlets. Leaves mostly 1—1 ·2 cm. long, petiolate, closely set, erect-spreading or spreading, slightly curved upwards, narrowly lanceolate-linear, convex and keeled on the dorsal surface, slightly convex on the ventral surface, furrowed on the lower half, at first pilose, becoming glabrous. Flower-heads about 1 ·5 cm. wide, globose, involucred by scale-like leaves, clustered in corymb-like groups. Bract spathulate, villous on the lower half of the dorsal surface, reaching to about the middle of the petals. Flowers curved slightly upwards. Calyx-tube obconic, clothed with caducous unicellular hairs : calyx-lobes spaced at the base, about half as long as the petals, linear,

tipped with a deciduous acumen, villous on the dorsal surface. Petals about 7 mm. long, linear-elliptic in the upper half, tapering to the base, obtuse, white, with 2 wing-like decurrent keels slightly above the middle. Stamens exserted : filaments slightly unequal in length : anthers 2 mm. long, linear : thecae free slightly more than $\frac{1}{3}$ of their length. Ovary $\frac{1}{2}$ inferior, rounded and glabrous in the upper part, with 2 imperfectly formed uniovulate chambers (rarely, by abortion, 1-chambered and with a solitary style) : ovules pendulous from near the top of the chambers : styles glabrous. Fruit woody, 1- or 2-seeded.

Caledon Div. : without precise locality, *Rogers* 29123 ; Palmiet River Valley, " from near sea-level to 2500 ft." April, 1922, *Stokoe* 385, in Bolus Herb. 17217, 17429 ; hills near the mouth of the Palmiet River, May, *Stokoe* 8260, in Bolus Herb. 17709 ; near Elgin, Palmiet River, *Stokoe* 8259 ; near Steenbras Reservoir, *Galpin* 12264 ; Hottentots Holland Mts., Oct. *Stokoe* in Nat. Herb. Pretoria 2597, in Marloth Herb. 11580 ; between Bot River and Palmiet River, April, *Marloth* 8377 ; Kogelberg, upper south-east slopes, stream-sides, 2000–3000 ft. *Esterhuysen* 9965 ; mountains south of Kogelberg, June, *Stokoe* in Nat. Herb. Pretoria 27146 ; upper part of Platberg, April, 1921, *Andreae* 863 ; hills near Kleinmond, *Stokoe* in S. Afr. Mus. Herb. 50245 ; Hermanus, *Rogers* 26561 ; ravine near Hermanus, *Smuts* 1202, in Marloth Herb. 11902 ; Rooi Els River, April, *Michell* in Bolus Herb. 15276, 15847 ; Mossel River, Water Kloof, *L. Guthrie* in Bolus Herb. 16936 ; Hanglip, upper eastern slopes, *Pillans* 8218.

7. **B. alopecuroides** *Thunb. Prodr. Pl. Cap.* 187 (1800) ; ej. *Diss. Brun.* 3 (1804) ; *Lam. Encycl.* suppl. i, 712 (1810) ; *Thunb. Fl. Cap.* ed. Schultes 206 (1823) ; *DC. Prodr.* ii, 44 (1825) excl. syn. Willd. ; *Brongn. in Ann. Sc. Nat.* viii, 375 (1826) ; *D. Dietr. Syn. Pl.* 1, 848 (1839) ; *Sond. in Harv. & Sond. Fl. Cap.* ii, 316 (1861–62) ; *Dümmer in Journ. Bot.* L, suppl. 2, p. 13 (1912). **Berzelia alopecuroides** *Sond. op. cit.* 310.

Usually 2—3 m. high, densely branched in the upper parts, with slender glabrous branchlets (resembling the branches of some species of Selaginella). Leaves 3—4 mm. long, closely set, erect-spreading, shortly petiolate, linear-lanceolate, subacute, tetragonal, glabrous except for minute hairs while in the young state. Flower-heads 4—5 mm. long, rotund, terminating very short branchlets with pale modified leaves, crowded in oblong clusters. Bract spathulate, glabrous or sparsely ciliate, reaching the middle of the petals. Bracteoles 2, linear-spathulate, sparsely ciliate. Calyx-tube obconic, glabrous : calyx-lobes spaced at the base, ovate, apiculate, sparsely ciliate, reaching to the middle of the petals. Petals about 1·5 mm. long, elliptic, tapering at the base, much recurved above the middle, minutely pubescent on the lower halves of both surfaces,

cream-coloured, with a pouch at the middle of the ventral surface and 2 keels below. Stamens shortly exserted: anthers scarcely 0·5 mm. long, sagittate: thecae free in the lower half. Ovary ½ inferior, conical and villous in the upper part, with 2 imperfectly formed uniovulate chambers: styles slender, glabrous, shortly exserted. Fruit dehiscent, 1-seeded: seeds elliptic, slightly compressed, wrinkled on the back, with a median ridge on the ventral surface.

Caledon Div.: Hottentots Holland Mts., Dec. Jan. *Stokoe* 221, 1021, 2581, in S. Afr. Mus. Herb. 25270; between Viljoen's Pass and Somerset Sneeuwkop, Oct. *Stokoe* 7035; Sneeuwkop, south aspect, 3500 ft., Dec. Jan. *Esterhuysen* 2620, 9720; south slopes of Viljoen's Pass, Oct. *Pillans* 8571; Kogelberg, lower east slopes, stream-side, Jan. *Esterhuysen* 9962, *Leighton* (3500 ft. Dec.) 872; Klein River Mts., south-east slopes, Sept. *Esterhuysen* 2894, Stokoe in Bolus Herb. 23036.

This species has a very distinct appearance, due to the arrangement and size of the flower-heads. The stamens are shorter and approach equality in length more than in any other species in the genus.

### Imperfectly Known Species.

**Brunia candicans** *Hort. ex Steud. Nom.* ed. 2, i, 231 (1840-41).

**B. capitata** *Desf. Tabl. Hort. Par.* ed. 2, p. 232 (1815).

**B. ciliata** *L. Sp. Pl.* 199 (1753).

**B. elegans** *Dum-Cours. Bot. Cult.* ed. 1, iii, 616 (1802) = **Lonchostoma elegans** *Schltr.*

**B. flagelliformis** *Hort. ex Steud. Nom. ed.* 2, i, 231 (1840).

**B. formosa** *Dum-Cours. l.c.*

**B. imbricata** *Wendl. f. ex Hoffm. Verz. Pfl. Nachtr.* i, 228; ii, 26; iv, 71 (1824-26).

**B. plumosa** *Lam. Encycl.* i, 475 (1785).

**B. Protea** *Crantz, Inst.* i, 357 (1766).

**B. sericea** *Hort. ex Dum-Cours. Bot. Cult.* ed. 2, vii, 329 (1814).

**B. speciosa** *Hort. ex Dum-Cours. op. cit.* vi, 279 (1811).

XII. BERZELIA *Brongn. in Ann. Sc. Nat.* viii, 370, tab. 35, fig. 1 (1826); *Endl. Gen.* 806, no. 4596 (1839); *Sond. in Harv. & Sond. Fl. Cap.* ii, 310 (1861–62); *Benth. & Hook. f. Gen. Pl.* i, 671 (1865); *Harv. Gen. S. Afr. Pl.* ed. 2, p. 103 (1868); *Nieden. in Engl. & Prantl, Pflanzenfam.* iii, 2a, 136 (1891); *Colozza in Ann. Bot. di Roma* ii, 13—18 (1905); *Thonner, Gen. Fl. Pl. Afr.* 237 (1915); *Marloth, Fl. S. Afr.* ii, § 1, p. 37 (1925); *Phillips, Gen. S. Afr. Fl. Pl.* 291 (1926); *Levyns, Guide to Flora of Cape Peninsula* 138 (1929). **Heterodon** *Meissn. Gen.* 72 (1837) partim. **Rabenhorstia** *Reichb. Nom.* 159 (1841).

Much or moderately branched shrubs. Leaves closely set or imbricate, petiolate, acicular, linear, lanceolate or ovate, trigonous or tetragonal, carinate on one or both surfaces, glabrous or ± pilose, mostly becoming glabrous. Stipules present or absent, minute, subulate. Flowers small, subtended by a bract and bracteoles, crowded in globose or rotund heads. Calyx-tube obconic or oblong, clothed with caducous unicellular hairs, adhering throughout to the ovary : calyx-lobes linear, subulate or acicular, villous or sparsely pilose. Petals free, oblanceolate, oblong, oblong-spathulate or fusiform in outline, glabrous, or sparsely pilose on the dorsal surface, bicarinate on the lower half of the ventral surface. Stamens exserted : anthers oblong or elliptic: thecae free in the lower half or slightly more. Ovary ½ to almost entirely inferior, conical in the upper part, tomentose or villous, unilocular, uniovulate : style solitary, slender, exserted : stigma minute. Fruit (imperfectly known) rotund, angular.

Named in honour of Berzelius, a Swedish chemist.

Leaves acicular, lanceolate-linear or linear-lanceolate, the surfaces, at least in the upper half, almost equal in width :
  Leaves persistently pilose .. .. .. .. .. (10) *Burchellii*
  Leaves glabrous at maturity :
    Leaves mostly slightly curved outwards, or straight, keeled on the ventral surface from the apex down ½—⅔ of their length ; anthers about 0·5 mm. long .. (12) *lanuginosa*
    Leaves mostly curved inwards, tetragonal in the upper half (surfaces almost equal in width) ; anthers about 0·75 mm. long .. .. .. .. .. .. (6) *intermedia*
Leaves lanceolate, linear-lanceolate or ovate, widest across the ventral surface :
  Flowering heads about 1 cm. wide :
    Leaves linear-lanceolate, distinctly incurved above the middle :
      Leaves acute ; petals spathulate .. .. .. .. (11) *Ecklonii*
      Leaves acuminate ; petals linear-oblong in the upper half, tapering to the base .. .. .. .. (9) *Galpinii*
    Leaves lanceolate or ovate, not incurved :
      Leaves lanceolate ; those at the base of the flower-head almost equally 3-sided .. .. .. .. .. (2) *abrotanoides*
      Leaves ovate or rarely lanceolate ; those at the base of the flower-head having the upper surface about twice as wide as either of the others .. .. .. .. (1) *cordifolia*
  Flowering heads less than 1 cm. in width :
    Petals distinctly widest at or below the middle .. .. (5) *commutata*
    Petals not distinctly widest at or below the middle :
      Petals spathulate or oblong-spathulate :
        Leaves mostly 5—8 mm. long ; the ventral surface convex throughout or flat at the base ; flowering heads mostly 4 mm. wide ; anthers 0·5 mm. long (4) *Dregeana*
        Leaves mostly 10—12 mm. long ; the ventral surface furrowed on the basal half ; flowering heads mostly 6—7 mm. wide ; anthers 0·5—0·75 mm. long .. .. .. .. .. .. .. (3) *arachnoidea*
      Petals linear-oblong, occasionally slightly wider in the lower half than in the upper, or slightly wider in the upper half than in the lower :

Leaves lanceolate, somewhat attenuate, almost square in cross section at the apex, stoutly keeled throughout the ventral surface and the greater part of the dorsal surface, mostly 10—12 mm. long; flowering heads about 8 mm. wide, on sparsely leafy peduncles; petals occasionally slightly and gradually widened from the base upwards; anthers lanceolate, 1 mm. long .. (7) *rubra*

Leaves lanceolate or linear-lanceolate, keeled on the greater part of both surfaces, almost flat on the apical half of the ventral surface, mostly 7—8 mm. long; flowering heads about 7 mm. wide, on densely leafy peduncles; petals often slightly wider in the lower half than in the upper; anthers oblong, 0·75 mm. long .. .. .. .. (8) *incurva*

1. **B. cordifolia** *Schldl. in Linnaea* vi, 189 (1831)! *Ecklon & Zeyher, Enum. Pl.* 138 (1835); *Sond. in Harv. & Sond. Fl. Cap.* ii, 312 (1861-62); *Dümmer in Journ. Bot.* L, suppl. 2, p. 11 (1912). **Brunia cordifolia** *D. Dietr. Syn. Pl.* i, 848 (1839).

About 60 cm. high, moderately branched, with pubescent branchlets. Leaves mostly 5—7 mm. long, ovate or lanceolate-ovate, obtuse or subacute, much compressed, ± keeled on the dorsal surface, glabrous, at first erect-spreading, often spreading or reflexed. Flower-heads mostly 8—9 mm. wide, orbicular, terminating short leafy branchlets, in almost corymbose clusters. Bract and bracteoles spathulate, clothed with caducous unicellular hairs on the dorsal surface, reaching the middle of the petals. Calyx-tube obconic, with caducous unicellular hairs: calyx-lobes linear, acute, scarcely half as long as the petals, with caducous unicellular hairs on the dorsal surface. Petals about 3·5 mm. long, oblong, obtuse, tapering towards the base, glabrous, bicarinate from the middle downwards. Stamens about twice as long as the petals: anthers scarcely 1·5 mm. long, oblong: thecae free $\frac{2}{3}$ of their length. Ovary almost entirely inferior. Fruit unknown.

BREDASDORP DIV.: at the base of the Potberg, Oct. *Ecklon & Zeyher* 1061; west base of the Potberg, Oct. *Pillans* 9352; middle south slopes of the Potberg, Oct. *Pillans* 9330.—SWELLENDAM DIV.: hills north of Elandspad Farm, Oct. *Pillans* 9511.

There is a very close affinity with *B. abrotanoides Brongn.* from which it is chiefly distinguished by broader leaves.

2. **B. abrotanoides** *Brongn. in Ann. Sc. Nat.* viii, 371 (1826); *Schldl. in Linnaea* vi, 188 (1831); *Schnizl. Iconogr.* iii, tab. 168, figs. 2-16 (1843-70); *Sond. in Harv. & Sond. Fl. Cap.* ii, 311 (1861-62) incl. vars.; *Dümmer in Journ Bot.* L, suppl. 2, p. 9 (1912) incl. vars.; *Colozza in Ann. di Bot. Roma* ii, 14, 40, tab. iv (1905) incl. var. [**Brunia foliolis creberrimis** etc. *Burm. Rar. Afr. Pl.* 266, tab. 100, fig. 1 (1738). **Erica capitata, seu nodiflora africana** *Pluk. Mant.* 69, tab. 346, fig. 7 (1769)].

**Brunia abrotanoides** *Linn. Sp. Pl.* ed. 1, p. 199 (1753); *Berg. Descr. Pl. Cap.* 59 (1767); *Linn. Mant.* altera 343 (1771); *Aiton, Hort. Kew.* i, 276 (1789); *Thunb. Prodr. Cap.* 41 (1794); *Linn. Syst. Veg.* ed. 15, p. 251 (1797); *Thunb. op. cit.* 187 (1800); ej. *Diss. Brun.* 6 (1804); *Pers. Syn. Pl.* i, 246 (1805); *Aiton, Hort. Kew.* ed. 2, ii, 34 (1811); *Thunb. Fl. Cap.* ed. Schultes 207 (1823); *DC. Prodr.* ii, 44 (1825); *Linn. Syst. Veg.* ed. 16, i, 782 (1825); *D. Dietr. Syn. Pl.* i, 848 (1839); *Richter, Syst.* 217 (1840). **Brunia deusta** *Thunb. Prodr. Cap.* 187 (1800); ej. *Diss. Brun.* 4; *Pers. Syn. Pl.* i, 246; *Lam. Encycl.* suppl. i, 712 (1810); *Thunb. Fl. Cap.* ed. Schultes 205; *DC. Prodr.* ii, 43; *Linn. Syst. Veg.* ed. 16, i, 782, excl. syn. **Brunia abrotanifolia** *F. G. Dietr. Vollst. Lexicon Gärtn.* ii, 320 (1802). **Berzelia brevifolia** *Ecklon & Zeyher, Enum.* 138 (1835)! . **Berzelia formosa** *Ecklon & Zeyher l.c.*! **Brunia brevifolia** *D. Dietr. Syn. Pl.* 848 (1839). **B. formosa** *D. Dietr. l.c.* **Brunia squarrosa** *Swartz ex Harv. & Sond. Fl. Cap.* ii, 311 (1861-62) non Thunb.

Usually 1—1·5 m. high, with glabrous branchlets. Leaves 2—5 mm. long, lanceolate, ovate-lanceolate or ovate, obtuse, usually with a distinct keel on the dorsal surface, somewhat convex or flat and often furrowed below and keeled above the middle of the ventral surface, glabrous, decurrent, erect-spreading or spreading. Stipules minute, subulate, ustulate. Flowering heads mostly 6—9 mm. wide, globose, terminating short branchlets, in corymb-like clusters. Bract and bracteoles spathulate, with caducous unicellular hairs on the dorsal surface, reaching to about the middle of the petals. Calyx-tube obconic, clothed with caducous unicellular hairs: calyx-lobes scarcely half as long as the petals, subulate, with few caducous hairs. Petals 2·5—3·5 mm. long, oblanceolate or oblong and narrowing towards the base, obtuse, thickened at the apex, with 2 minute keels from the middle downwards, glabrous, cream-coloured. Stamens twice as long as the petals: anthers about 1 mm. long, oblong: thecae free $\frac{2}{3}$ of their length. Ovary almost entirely inferior, villous on the upper part. Fruit unknown.

Bredasdorp Div.: hills near Bredasdorp, *Galpin* 10466; Hospital Farm, Dec. *Galpin* 11353; flats near Bredasdorp, Aug. *Compton* 9020; flats between Bredasdorp and Struys Bay, Aug. *Esterhuysen* 2946; Zoutendals Vlei, Oct. *Esterhuysen* 4346.—Caledon Div.: Houwhoek, Sept. *Lamb* 1827; Pringle Bay, *Compton* 6108; Hermanus, Jan. *Burtt-Davy* 18702, Sutton 459; Mossel River, Dec. *Potts* 1555; near Villiersdorp, 1500 ft. Nov. *Schlechter* 9365.—Cape Div.: flats near Wynberg and the Tigerberg, Aug.–Dec. *Ecklon & Zeyher* 1059; near Wynberg, *Pappe* in S. Afr. Mus. Herb. 15785; near Princess Vlei, *MacOwan* 1610; flats east of the Camp Ground, *Bolus* 3266; flats between Wynberg and Muizenberg, *Bolus* 2786; near Cape Town, *Humbert* 9344; Kommetje, Nov.

*Galpin* 4036 ; Diep River, *Marloth* 7307 ; above Smitswinkel Bay, April, *Compton* 8726 ; Sirkels Vlei, Oct. *Leighton* 666 ; east slopes of Table Mt. near Constantia, Oct. *Ecklon & Zeyher* 1060 ; Witsand, margin of stream, Oct. *Pillans* 9965 ; Durban Road, *Marloth* 3254 ; flats between Tigerberg and Stellenbosch, *Drège* 6864 ; near road to Melkbosch Strand, Sept. *Bond* 516 ; flats west of Bottelary Hills, Sept. *Pillans* 9964.—CLANWILLIAM DIV. : Grey's Pass, Aug. *Schlechter* 4971.—MALMESBURY DIV. : near Darling, Sept. *Grant* 2543 ; flats south of Mamre, Sept. Oct. *Compton* 13879, *Pillans* 9864 ; Hopefield, Sept. *Compton* 15970, *Letty* 71 ; Berg River Station, July, *Barker* 4048.—TULBAGH DIV. : damp places on mountains near Tulbagh, Sept. *Ecklon & Zeyher* 1058.

3. **B. arachnoidea** *Ecklon & Zeyher, Enum.* 138 (1835). **Brunia rubra** *Willd. in Denkschr. Acad. Muench.* i, 131, tab. vii fig. 1 (1808) ; *Linn. Syst. Veg.* ed. 16, i, p. 782 (1825) ; *D. Dietr. Syn. Pl.* 1, 848 (1839). **Brunia ericoides** *Wendl. Collect.* ii, tab. 57 (1810). **Brunia arachnoidea** *Wendl. Collect.* ii, tab. 62 (1810) ; *DC. Prodr.* ii, 44 (1825) ; *D. Dietr. Syn. Pl.* i, 848 (1839). **Berzelia superba** *Ecklon & Zeyher, Enum.* 138 (1835) **Heterodon superbus** *Meissn. Gen. Comm.* 52 (1837). **Berzelia squarrosa** *Sond. in Harv. & Sond. Fl. Cap.* ii, 312 (1861-62) incl. var. $\beta$, excl. var. $\gamma$ and syn. Thunb.

Usually about 1 m. high, with arachnoid-pilose or almost glabrous branchlets. Leaves mostly 1—1·5 cm. long, erect-spreading, rarely spreading or recurved, linear-lanceolate, ustulate-apiculate, trigonous, keeled on the dorsal surface, furrowed on the ventral surface and often keeled towards the apex, at first arachnoid-pilose, usually soon becoming glabrous. Stipules minute, subulate, ustulate. Flowering heads mostly 6—8 mm. wide, globose, terminating short almost leafless branchlets arranged in raceme-like formation. Bract and bracteoles spathulate, with caducous hairs on the dorsal surface, reaching about the middle of the petals. Calyx-tube clothed with caducous unicellular hairs : calyx-lobes linear, subulate-apiculate, with caducous unicellular hairs on the dorsal surface, reaching the middle of the petals. Petals 1·75—2 mm. long, oblong-spathulate, distinctly bicarinate from the middle downwards, with a few caducous hairs on the lower half of the dorsal surface, cream-coloured. Stamens twice as long as the petals : anthers scarcely 0·75 mm. long, elliptic : thecae free $\frac{2}{3}$ of their length. Ovary $\frac{3}{4}$ inferior. Fruit unknown.

CALEDON DIV. : Hottentots Holland Mts. Langkloofberg, Oct. *Esterhuysen* 9152 ; Landdrost Kop, 4000 ft. *Stokoe* 6030, *Esterhuysen* (Dec.) 2621 ; Somerset Sneeuwkop, 3500—4000 ft. *Stokoe* 6030, *Esterhuysen* 8274, 9719 ; between Viljoen's Pass and Somerset Sneeuwkop, Oct. *Stokoe* 7034 ; Genadendal Mts. 4000 ft. Oct.–Nov. *Stokoe* 2503 ;

Wildepaardeberg, *Stokoe* 2739; Appels Kraal, *Zeyher* 2641; River Zonder Einde Mts. Sept. Oct. *Stokoe* 2155, 8905, 9241, in S. Afr. Mus. Herb. 56814, 56815, *Barnard* 422; Klein River Mts., *Ecklon & Zeyher* 1057, *Esterhuysen* (Sept.) 2895, *Stokoe* 6025,6029; near Vogelgat, *Schlechter* 9561; Babylons Tower, *Esterhuysen* 4989.—CERES DIV.: near Michell's Pass, Slab Peak, *Esterhuysen* 6180, *Compton* 11961, *Stokoe* (Oct.) in S. Afr. Mus. Herb. 56813; behind Castle Rock, *Stokoe* 2828; Ceres, *Rogers* 28752; gorge west of Ceres, *Hutchinson* 602; Witzenberg Vlakte, *Compton* 11981; east slopes of the Witzenberg, *Andreae* 157; Warm Bokkeveld, *Bolus* 2611; Koude Bokkeveld, 4000 ft. *Schlechter* 8296.—CLANWILLIAM DIV.: Cederberg, Eikerboom, 2500 ft. Sept. *Leighton* in Bolus Herb. 21604; Elandskloof, Sept. *Compton* 16175; Ertjieslandkloof, *Compton* 16088.—PAARL DIV.: slopes north of Pic Blanc, 2500 ft., *Esterhuysen* 1664; between Limietberg and Bailey's Peak, 3000 ft. *Esterhuysen* 1640; Wemmershoek Valley, *Esterhuysen* 11443; Bain's Kloof Area, Baviaans Kloof, *Leighton* 1347.—ROBERTSON DIV.: Omklaar, *Stokoe* 6031.—STELLENBOSCH DIV.: between Guardian Peak and the Triplets, *Esterhuysen* 9800; north side of Somerset Sneeuwkop, 3500 ft. *Esterhuysen* 9719.—TULBAGH DIV.: Waterfall Kloof, March, *Ecklon & Zeyher* 1056, *Esterhuysen* 1694; Tulbagh, *Schlechter* 7478; Witzenberg, *Ecklon & Zeyher* in S. Afr. Mus. Herb. 15786.—WORCESTER DIV.: Waterkloof, 20 miles north of Worcester, *Andreae* 340; Matroosberg, 4000 ft. Aug. *Gillett* 3602; Wabooms River, Sept. *Esterhuysen* 8988; Hex River Valley, *Tyson* 788.

The first trivial name, *rubra*, given to this species in 1808 cannot be used in combination because of the publication of *Berzelia rubra* Schldl. in 1831.

4. **B. Dregeana** *Colozza in Nuov. Giorn. Bot. Ital.* x, 396 (1903); *in Ann. di Bot. Roma* pp. 15, 39, tab. 3 (1905). **Brunia squarrosa** *Thunb. Diss. Brun.* 5 (1804); ej. *Fl. Cap.* ed. Schultes 206 (1823); *DC. Prodr.* ii, 44 (1825); *Linn. Syst. Veg.* ed. 16, i, 782 (1825).

About 1 m. high, densely branched, with arachnoid-pilose branchlets. Leaves mostly 5—8 mm. long, erect-spreading, rarely spreading or recurved, linear-lanceolate, obtuse, ustulate-apiculate, stoutly keeled on the dorsal surface, slightly convex on the ventral surface, flat or somewhat furrowed at the base, slightly keeled towards the apex, at first arachnoid-pilose, usually soon becoming glabrous. Stipules subulate, minute, not always present. Flowering heads about 4 mm. wide, globose, terminating very short leafless branchlets, arranged in raceme-like formation. Bract and bracteoles spathulate, with caducous hairs on the dorsal surface, reaching the middle of the petals. Calyx-tube broadly oblong, sparsely clothed with caducous unicellular hairs: calyx-lobes

lanceolate, with caducous hairs on the dorsal surface, scarcely reaching the middle of the petals. Petals about 1·5 mm. long, spathulate, thickened below the middle, not apparently keeled, cream-coloured, with a few hairs below the middle on both surfaces. Stamens shortly exserted: anthers 0·5 mm. long, broadly elliptic: thecae free $\frac{2}{3}$ of their length. Ovary $\frac{1}{2}$ inferior, conical and villous in the upper part. Fruit unknown.

Caledon Div.: Hottentos Holland Mts., *Zeyher* 2643, *Stokoe* (Sept.–Nov.) 6024, 7333, 7334, in Bolus Herb. 17734, 17741, 18360; Palmiet River Valley, *Stokoe* 6023; Kogelberg, *Lamb* 2970, *Esterhuysen* 9964, *Stokoe* (Aug.–Nov.) 996, in S. Afr. Mus. Herb. 27425, 56810; Rooi Els Area, July, *Stokoe* 6006.—Stellenbosch Div.: Helderberg, *Stokoe* 6026.

This species is often confused with *B. arachnoidea*, from which it can be distinguished by its smaller flower-heads, exactly spathulate petals and shorter stamens.

5. **B. commutata** *Sond. in Harv. & Sond. Fl. Cap.* ii, 310 (1861-62)! *Colozza in Ann. Bot. di Roma* ii, pp. 13, 39 (1905); *Dümmer in Journ. Bot.* L, suppl. 2, p. 8 (1912). **B. comosa** *Ecklon & Zeyher, Enum.* 137 (1835) absque descr., nomen confusum, excl. syn.

About 1 m. high, with glabrous branchlets. Leaves 3—7 mm. long, erect-spreading, linear-lanceolate, acute or obtuse, trigonous, glabrous, flat and with a prominent median vein on the upper half of the ventral surface. Flowering heads 4—7 mm. wide, globose, terminating short branchlets with modified leaves. Bract and bracteoles spathulate, villous on the lower half of the dorsal surface, slightly overtopping the calyx-lobes. Calyx-tube obconic, clothed with deciduous unicellular hairs: calyx-lobes spaced at the base, subulate, villous on the dorsal surface, reaching the middle of the petals. Petals about 1·5 mm. long, oblong or widest at or below the middle and slightly narrowed from the middle upwards and downwards, obtuse, glabrous, with 2 minute keels on the lower half. Stamens scarcely twice as long as the petals to thrice as long: anthers oblong: thecae free in the lower half. Ovary slightly more than half inferior, tomentose on the upper part. Fruit unknown.

Albany Div.: near Grahamstown, *Schönland* 244; Kloof near Collingham, *Britten* 5613.—Alexandria Div.: Governor's Kop, Dec. *Barker* 591.—Humansdorp Div.: Kouga Poort, 400 ft. Dec. *Fourcade* 3543; flats at Ratels Bosch, 700 ft. Sept. *Fourcade* 350; Hoogeberg, 2500 ft. Oct. *Keet* 983; Kareedouw Pass, Jan. *Britten* 1232; Humansdorp, *Thode* A715.—Port Elizabeth Div.: Port Elizabeth *Kemsley* 235; Frames Drift, *Paterson* 1916; Zwartkops River, Dec. Jan. *Zeyher* 734, 2644.—Uitenhage Div.: Van Staadens Berg, Jan. 1000 ft. *Bolus* 1574, *MacOwan* 1092; Van Staadens Gorge, *Long*, 220, 623.—Uniondale

Div. : Lauterwater 2300 ft. *Compton* 4469 ; between Haarlem and Avontuur, *Schönland* 3088.

6. **B. intermedia** *Schldl. in Linnaea* vi, 188 (1831) ! *Sond. in Harv. & Sond. Fl. Cap.* ii, 311 (1861-62) ; *Dümmer in Journ. Bot.* L, suppl. 2, p. 8 (1912) excl. var. **B. ericoides** *Ecklon & Zeyher, Enum.* 137 (1835) comb. nov. **B. Wendlandiana** *Ecklon & Zeyher l.c.* nom. nov. **Brunia intermedia** *D. Dietr. Syn. Pl.* i, 848 (1839).

Usually 1—1·5 m. high, with glabrous or sparsely pilose branchlets. Leaves mostly 3—4 mm. long, closely set, ovate-lanceolate, lanceolate, linear-lanceolate or acicular, obtuse or acute, tipped with a slender acumen, tetragonal (at least so in the upper half), almost equal sided, glabrous, erect-spreading, spreading or recurved from the base, usually somewhat incurved above the middle. Stipules occasional, minute. Flowering heads usually 0·8—1 cm. wide, globose or rotund, terminating short branchlets with modified leaves, clustered. Bract and bracteoles shortly overtopping the calyx, spathulate, with long caducous hairs on the dorsal surface. Calyx-tube obconic, clothed with caducous unicellular hairs : calyx-lobes subulate, decurrent on the tube, with a few caducous hairs on the dorsal surface, reaching the middle of the petals. Petals 2—3 mm. long, oblong or somewhat spathulate-oblong, obtuse, tapering towards the base, cream-coloured, with 2 keels from the middle to the base. Stamens about twice as long as the petals : anthers 0·75—1·25 mm. long, oblong : thecae free $\frac{2}{3}$ of their length. Ovary almost entirely inferior, tomentose on the top. Fruit rotund, woody, with projecting angles on the dorsal surface, convex on the ventral surface.

Albany Div. : near Grahamstown, Mountain Drive, *Marloth* 10914, *Liebenberg* G. 146, *Glass* (Febr.) in Natal Herb. 5218 ; Signal Hill Range, *Galpin* 321 ; Coldspring, Paradise Kloof, Jan. *Salisbury* in S. Afr. Mus. Herb. 8211 ; Dassie Krantz, *Schönland* 250. Caledon Div. : Palmiet River Valley, Dec. Jan. *Stokoe* 8261, 8821 ; near Palmiet River Mouth, *Esterhuysen* 12581 ; Kogelberg, lower east slopes, near stream, Jan. *Esterhuysen* 9967 ; River Zonder Einde Mts. 1000 ft. *Stokoe* 8904.—Cape Div. : Table Mt. slopes south-east of Tunnel Gorge, Febr. *Phillips* in S. Afr. Mus. Herb. 2694 ; Orange Kloof, 1800 ft. *Compton* in Bolus Herb. 17654 ; Groot Kop, south-east slopes, 2000 ft. Jan. Febr. *Andreae* 218, *Compton* 13068, *Esterhuysen* 7817, 10017, 10032, *Pillans* 9859 ; marsh above Smitswinkel Bay, Jan. *Pillans* 9974 ; Skilpad Vlei, Nov. *Leighton* 2313.—Ceres Div. : Conical Peak, Dec. *Stokoe* 7625.—Clanwilliam Div. : Cederberg, Nov. *Stokoe* 7332.—George Div. : George, moist places, Dec. *Pappe* in S. Afr. Mus. Herb. 37683 ; five miles east of George, *Hutchinson* 1266 ; Montagu Pass, moist slopes, Nov. *Esterhuysen* 10853, *Hutchinson* 1189, *Burtt-Davy* 12603.—Humansdorp Div. : Witte Els

Bosch, mountain slopes, 900 ft. Aug. *Fourcade* 804, *Esterhuysen* (Nov.) 7999 ; Hofman's Bosch, *Britten* 1224 ; flats at Oudebosch, 750 ft. Dec. *Fourcade* 2882 ; Lourie Plantation, Jan. *Dix* 166 ; Humansdorp, *Flanagan* 2896.—KNYSNA DIV. : near Plettenberg Bay, Dec. *Leipoldt* in Bolus Herb. 17088 ; Outeniqua Mts., *Hops* 72 ; Prince Alfred's Pass, Dec. *Barker* 611 ; Clarkson, Aug. *Thode* A834 ; Zitzikama, Coldstream, rocky ridge at coast, April, *Galpin* 9362.—LADISMITH DIV. : kloof north of Klein Zwartberg Peak, near stream, Dec. *Andreae* 1262.—MONTAGU DIV. : Cogmans Kloof, *Tredgold* 428.—PAARL DIV. : Groot Drakenstein, *Rogers* 10502 ; slopes north of the top of French Hoek Pass, *Esterhuysen* 11615.—RIVERSDALE DIV. : Albertinia, Oct. *Muir* in Bolus Herb. 13673 ; Corente River, 1000 ft. Nov. *Muir* 101 ; Garcia's Pass, *Leighton* in Bolus Herb. 23027, *Thorne* in S. Afr. Mus. Herb. 13673.—STELLENBOSCH DIV. : clay slopes below Pic Sans Nom, near Diep Gat Ravine, 2000 ft. Jan. *Esterhuysen* 12517.—SWELLENDAM DIV. : Duyvelsbosch, Oct. *Ecklon & Zeyher* 1053 ; Puspas Vlei, *Ecklon & Zeyher* 1052 ; mountains near Swellendam, *Barnard* in S. Afr. Mus. Herb. 37288, *Compton* (4500 ft.) 10602, *Esterhuysen* (Febr.) 4815 ; Langebergen, above Strawberry Hill, moist places, Sept. *Esterhuysen* 10408 ; Leeuw River Mts. 4000 ft. *Stokoe* 8262, 8263, in S. Afr. Mus. Herb. 56809.—UITENHAGE DIV. : Van Staaden's Gorge, *Long* 643, *Paterson* 887, 1916 ; Van Staaden's River Mts., *Zeyhor* 728, *Ecklon & Zeyher* (Oct.) 1054, *Bolus* (Jan.) 1573.—UNIONDALE DIV. : top of Prince Alfred's Pass, 5100 ft. Dec. *Bolus* 11493, *Schönland* 3418 ; Kouga Mts., near Kouga Peak, south slopes, *Esterhuysen* 10809 ; Helpmekaar Peak, Jan. *Esterhuysen* 4625 ; north slopes of Outeniqua Mts., near Joubertina, 3000 ft. Nov. *Esterhuysen* 10666 ; Kouga Mts., near Smutsberg south slopes, 4000—5000 ft. *Esterhuysen* 10720 ; north slopes of Outeniqua Mts., Die Hoek, streamside, Nov. *Esterhuysen* 10589, 10665 ; Lauterwater, Jan. *Bond.* 891 ; Kammanassie Mts., Mannetjieberg, 5000 ft. Febr. *Esterhuysen* 4714, 6479 ; Blaauwbosch Nek, 3400 ft. Jan. *Fourcade* 2530.

7. **B. rubra.** *Schldl. in Linnaea* vi, 189 (1831)! excl. syn. Spreng. **B. squarrosa** Sond. **var. reflexa.** *Sond. in Harv. & Sond. Fl. Cap.* ii, 312 (1861–62); *Dümmer in Journ. Bot.* L, suppl. 2, p. 11 (1912) excl. syn. Thunb. et Willd.

About 1 m. high, moderately branched, with arachnoid-pilose branchlets. Leaves mostly 1—1·2 cm. long, erect-spreading, spreading or reflexed, linear-lanceolate, obtuse, slightly incurved, stoutly keeled on the greater part of the dorsal surface and throughout the ventral surface, tetragonal about the apex, at first pilose, becoming glabrous. Flowering heads mostly 7—8 mm. wide, globose, terminating short branchlets arranged in a raceme-like formation. Bract and bracteoles spathulate,

villous on the dorsal surface, reaching to shortly above the middle of the petals. Calyx-tube broadly oblong, clothed with caducous unicellular hairs : calyx-lobes linear-lanceolate, apiculate, with caducous hairs on the dorsal surface, reaching to shortly above the middle of the petals. Petals about 2 mm. long, linear-oblong, tapering towards the base, obtuse, glabrous or sparsely pilose on the lower half of the dorsal surface, cream-coloured, indistinctly keeled on the lower half. Stamens shortly exerted : anthers 1 mm. long, elliptic : thecae free $\frac{2}{3}$ of their length. Ovary slightly more than $\frac{1}{2}$ inferior, conical and villous in the upper part. Fruit unknown.

Caledon Div. : Klein River Mts., *Ecklon & Zeyher* 1055, *Stokoe* 508, 6022, 8258, in S. Afr. Mus. Herb. 13194, 56811, *Esterhuysen* (Sept.) 2922; mountains near Vogelgat, *Schlechter* 9561 ; near Hermanus, Maanschyn Kop, summit, 3000 ft. April, *Galpin* 12862, *Stokoe* (May) 8257 ; mountains east and north of Hermanus, *Gillett* 984, *Gilmore* 2504.

8. **B. incurva.** sp. nov.; ramulis pilosis; foliis imbricatis incurvis lineari-lanceolatis obtusis, marginibus sparse pilosis demum glabris ; capitibus globosis ; bractea bracteolisque oblanceolato-spathulatis ; tubo calycis obconico piloso ; sepalis anguste linearis dorso pilosis ; petalis oblongis obtusis, infra medium carinatis ; staminibus conspicue exsertis ; antheris oblongis ; ovario $\frac{1}{2}$ inferiore, supra medium piloso.

About 1 m. high, with pilose branchlets. Leaves mostly 6—7 mm. long, very closely set, imbricate, linear-lanceolate, obtuse, keeled on the dorsal surface, slightly convex on the ventral surface, sparsely pilose on the margins and keel, becoming glabrous, erect-spreading or spreading, incurved from the middle. Flowering-heads mostly 6—7 mm. wide, globose, terminating short leafy branchlets. Bract and bracteoles oblanceolate-spathulate, with caducous hairs on the dorsal surface, reaching to shortly above the middle of the petals. Calyx-tube obconic, clothed with caducous hairs : calyx-lobes narrowly linear, acute, clothed with caducous hairs on the dorsal surface, extending shortly beyond the middle of the petals. Petals 2 mm. long, oblong, occasionally widest below the middle, obtuse, glabrous, with 2 keels converging from the middle downwards. Stamens twice as long as the petals : anthers about 0·75 mm. long, oblong : thecae free $\frac{2}{3}$ of their length. Ovary $\frac{1}{2}$ inferior, with caducous hairs on the upper part. Fruit unknown.

Caledon Div. : without precise locality, Jan. 1929, *Paterson* in Bolus Herb. 18879 (type) ; Babylons Tower, Febr. *Esterhuysen* 4984, *Stokoe* (March) 7425, in S. Afr. Mus. Herb. 53657, *Thorne* in S.A. Mus. Herb. 53668 ; Klein River Mts., *Stokoe* 8801.

Distinguished by its crowded incurved leaves.

9. **B. Galpinii.** sp. nov. ; ramulis pilosis ; foliis lineari-lanceolatis

utrinque valde carinatis, primum pilosis; capitibus globosis; bractea bracteolisque oblanceolatis attenuatis dorso pilosis; tubo calycis oblongo piloso, sepalis lanceolato-acicularibus; petalis ellipticis, apici basique attenuatis, infra medium carinatis; staminibus valde exsertis; antheris lineari-oblongis; ovario subinferiore.

Usually 1·5—2 m. high, with pilose branchlets. Leaves mostly 0·8—1 cm. long, erect-spreading, spreading or slightly reflexed, linear-lanceolate, attenuate, prominently keeled on both surfaces, tetragonal towards the apex, slightly incurved above the middle, at first pilose, soon becoming glabrous. Flowering heads usually 1—1·3 cm. wide, globose, terminating short leafy branchlets, clustered in almost corymbose formations. Bract and bracteoles almost as long or slightly longer than the flower, oblanceolate, attenuate towards both ends, with caducous hairs on the dorsal surface. Calyx-tube oblong, slightly widened above the middle, clothed with long caducous unicellular hairs: calyx-lobes decurrent on the tube, lanceolate-acicular, setaceo-acuminate, reaching the middle of the petals. Petals 2·5—3 mm. long, elliptic (widest at the middle), tapering towards both ends, obtuse, with long caducous hairs on the lower half of the dorsal surface, cream-coloured, with 2 keels from the middle downwards. Stamens much exerted: anthers 1 mm. long, linear-oblong: thecae free ⅔ of their length. Ovary almost entirely inferior. Fruit unknown.

Riversdale Div.: Garcia's Pass, c. 1000 ft. Sept. 1897, *Galpin* 4035, *Smith* 2749; Mozambique Kop, 1400 ft. *Muir* 3426; Langebergen, Glen Leith, stream-side, Sept. *Muir* 3319 (type, in Bolus Herb.).

The affinity is with *B. intermedia* from which it is distinguished by much longer leaves, larger flower-heads and by petals tapering towards both ends.

10. **B. Burchellii.** *Dümmer in Journ. Bot.* L, suppl. 2, p. 10 (1912).

About 60 cm. high, with pilose branchlets. Leaves mostly about 4 mm. long, closely set, acicular, acute, tetragonal, clothed with subpersistent grey pilosity, erect-spreading, incurved above the middle. Flowering heads 7—8 mm. wide, rotund or globose, terminating short leafy branchlets, clustered in a corymbose formation. Bract and bracteoles oblanceolate, persistently pilose on the dorsal surface, reaching to shortly above the middle of the petals. Calyx-tube obconic, clothed with caducous hairs: calyx-lobes subulate, sparsely pilose, reaching the middle of the petals. Petals about 2·5 mm. long, linear-oblong, obtuse, tapering towards the base, pilose on the lower half of the dorsal surface, indistinctly keeled on the lower half. Stamens twice as long as the petals: anthers 0·75 mm. long, oblong: thecae free ⅔ of their length. Ovary

almost entirely inferior, with caducous hairs on the summit. Fruit unknown.

Riversdale Div. : Langebergen, marshy places near the base, above Corenti River, Nov. *Muir* 102, in Galpin Herb. 5096 ; Garcia's Pass, 1200 ft. Oct. *Galpin* 4037 ; Kampscheberg, 3000—4000 ft. Oct. *Thorne* in S. Afr. Mus. Herb. 41600.

The subpersistent pilosity of the leaves distinguishes this species from all others in the genus.

11. **B. Ecklonii** nom. nov. ; **Brunia alopecuroidea** *Ecklon & Zeyher, Enum.* 139 (1835) ! non Thunb., absque descr. ; **Berzelia intermedia var. β,** *Sond. in Harv. & Sond. Fl. Cap.* ii, 311 (1861-62) ; **var. alopecuroidea** *Dümmer in Journ. Bot.* L, suppl. 2, p. 9 (1912).

About 60 cm. high, moderately branched, with sparsely pilose branchlets. Leaves mostly 4—5 mm. long, erect-spreading, linear-lanceolate, subacute, tetragonal, sparsely ciliate below the middle, slightly incurved above. Flowering heads about 1 cm. wide, rotund, terminating short leafy branchlets, clustered in corymbose formations. Bract oblanceolate, tapering towards the apex, with caducous hairs on the dorsal surface, reaching to shortly above the middle of the petals. Calyx-tube obconic, clothed with caducous unicellular hairs : calyx-lobes decurrent on the tube, $\frac{1}{3}$ of the length of the petals, linear, acute, with caducous hairs on the dorsal surface. Petals about 3·5 mm. long, narrowly spathulate, obtuse, glabrous, with 2 keels converging from the middle downwards. Stamens twice as long as the petals : anthers about 1 mm. long, oblong : thecae free $\frac{2}{3}$ of their length. Ovary almost entirely inferior. Fruit unknown.

Caledon Div. : Hottentots Holland Mts., Nov. Dec. *Stokoe* in Bolus Herb. 17321, 17869, in S. Afr. Mus. Herb. 25305 ; Palmiet River and Hanglip, *Ecklon & Zeyher* 1067 ; Palmiet River Valley, near Elgin, damp places, Oct.-Jan. *Stokoe* 8264, 8820, in S. Afr. Mus. Herb. 56795, *Compton* 14120, 16527 ; Kogelberg, 1000—2000 ft. *Compton* 16452, 16455, *Stokoe* in S. Afr. Mus. Herb. 56796 ; south-east of Kogelberg, 2500 ft. Sept. *Stokoe* 7142, *Leighton* 757.

Ecklon and Zeyher listed their 1067 (which belongs here) as *Brunia alopecuroidea* Thunb., and Sonder and Dümmer made it a variety of *Berzelia intermedia* Schldl. It is specifically distinct from both, and is therefore given a new name.The clavate axis of the flower-head persists for several years and serves as a distinguishing character for the species.

12. **B. lanuginosa** *Brongn. in Ann. Sc. Nat.* viii, 372, tab. 35, fig. 1 (1826) ; *Schldl. in Linnaea* vi, 188 (1831) ; *Ecklon & Zeyher, Enum.* 137 (1835) ; *Sonder in Harv. & Sond. Fl. Cap.* ii, 311 (1861-62) incl. vars. ; *Colozza in Ann. di Bot. Roma* ii, pp. 13, 39 (1905) ; *Engler & Drude, Veget.*

*Erde* ix, 1, 2, p. 487, figs. H—K (1910) ; *Dümmer in Journ. Bot.* L, suppl. 2, p. 9 (1912) ; *Marloth, Fl. S. Afr.* ii, § 1, p. 38, fig. 21 (1925) ; *Levyns, Guide to Flora of Cape Peninsula* fig. 91 (1929). [**Abrotanodendron Africanus Ericae**—*Ray, Hist. Plant.* suppl. 233 no. 11 (1704). **Brunia foliis linearibus patulus** *Linn. Hort. Cliff.* 71, no. 2 (1737); *Wachendorff, Horti Ultra* 202 (1747). **Cupressus nana**—*Weinm. Phytanth. Icon.* ii, 297, tab. 448, fig. C (1737-45). **Tamariscus monomotapensis**—*Pluk. Almagestum Bot.* 361 (1769) ; ej. Phytographiâ tab. 318, fig. 4 (1769)]. **Brunia lanuginosa** *Linn. Sp. Pl.* ed. 1, p. 199 (1753) ; *Berg. Descr. Pl. Cap.* 60 (1767) ; *Linn. Mant. altera* 343 (1771) ; *Lam. Encycl. Meth.* i, 474 (1785) ; *Aiton, Hort. Kew.* 1, 276 (1789) ; *Thunb. Prodr. Pl. Cap.* 41 (1794) ; *Linn. Syst. Veg.* ed. 15, p. 251 (1797) ; *Willd. Sp. Pl.* i, pars 2, p. 1142 (1798) ; *F. G. Dietr. Vollst. Lexicon Gärtn.* ii, 321 (1802) ; *Thunb. Diss. Brun.* pp. 4, 7, 8 (1804) ; *Wendl. Coll.* i, tab. 11 (1805) ; *Pers. Syn. Pl.* i, 246 (1805) ; *Aiton, Hort. Kew.* ed. 2, ii, 34 (1811) ; *Lodd. Bot. Cab.* tab. 572 (1821) ; *Thunb. Fl. Cap.* ed. Schultes 205 (1823) ; *DC. Prodr.* ii, 44 (1825) ; *Linn. Syst. Veg.* ed. 16, i, 782 (1825) excl. syn. Lam. ; *D. Dietr. Syn.* Pl. i, 848 (1839) ; *Richter, Syst.* 217 (1840). **Brunia superba** *Donn, Ind. Hort. Cantab.* 25 (1796) ; *Willd. Sp. Pl.* i, pars 2, p. 1143 (1798) ; *F. G. Dietr. Vollst. Lexicon Gärtn.* ii, 322 (1802) ; *Pers. Syn. Pl.* i, 246 (1805) ; *Lam. Encycl.* suppl. i, 712 (1810) ; *Aiton, Hort. Kew.* ed. 2, ii, 35 (1811) ; *DC. Prodr.* ii, 44 (1825) ; *Reichb. Hort. Bot.* tab. 100 (1827) ; *D. Dietr. Syn. Pl.* i, 844 (1839). **Brunia tenuifolia** *Willd. in Denkschr. Akad. Muench.* 129, tab. b, fig. 2 (1808) ; *Schnizl. Icon.* iii. tab. 168, fig. 1 (1843-70). **Berzelia lanuginosa** var. **tenuifolia** *Zahlb. in Ann. Hoffm. Wien.* xx, 13 (1905) ; *Dümmer in Journ. Bot.* L, suppl. 2, p. 9 (1912).

Usually 1·5—2 m. high, with slender pilose or sometimes glabrous branchlets. Leaves mostly 3—7 mm. long, crowded, erect-spreading, usually slightly curved outwards or straight, decurrent, lanceolate-linear or acicular, obtuse, trigonal, slightly convex and keeled on the ventral surface from the apex $\frac{1}{2}$—$\frac{2}{3}$ of the length, glabrous or very sparsely pilose on the margins. Stipules minute, adhering to the base of the petiole. Flowering heads mostly 5—8 mm. broad, globose, terminating short branchlets and grouped in a raceme-like formation. Bract and bracteoles spathulate, almost as long as the flower, with deciduous hairs on the dorsal surface. Calyx-tube narrowly obconic, clothed with caducous unicellular hairs : calyx-lobes decurrent on the tube, subulate, half as long as the petals, with deciduous hairs on the dorsal surface. Petals 1·5—1·75 mm. long, oblong, obtuse, tapering towards the base, cream-coloured, with a prominent median nerve, bicarinate on the lower half. Stamens much exserted : anthers 0·75 mm. long, oblong ; thecae free

⅔ of their length. Ovary almost entirely inferior, narrowly obconic, villous on the summit: style slightly shorter than the petals. Fruit unknown.

South Africa: without precise locality, *Schlechter* 5684.—Bredasdorp Div.: near Napier, Oct. *Esterhuysen* 4271.—Caledon Div.: without precise locality, *Rogers* 29216; Caledon, *Fries, Norlindh and Weimarck* 1560, *Guthrie* 2486, *Marloth* 7064; Zwartberg, 2000, Oct. *Galpin* 4034; Elgin, *Smith* 2575; between Stettynsberg and Louwshoek Peak, marsh on south side, 3000—4000 ft. *Esterhuysen* 1145; Kogelberg, lower east slopes, *Esterhuysen* 9971; Hanglip, *Compton* 13606; River Zonder Einde Mts. Sept. *Zeyher* 2642; Danger Point Mt. *Leighton* 1574.—Cape Div.: Table Mt., *Rogers* 1107, *Esterhuysen* 10120, 11394; Echo Valley, Nov. *Bolus* 2611; Platte Klip, *Pappe* in S. Afr. Mus. Herb. 15784; Cape Peninsula, *Ecklon & Zeyher* 1050, *Humbert* 9578; Kirstenbosch, clay ridge, *Barker* 240, *Forbes* 105; plateau on the Muizenberg, Aug. *Schlechter* 1281; Steenberg, July, *W. Dod* 2733; East slopes of the Zwartkop Range, damp soil, Oct. *Pillans* 9885; Witsand, *Smuts* 1130; Cape Flats, Oct. *Pappe* in S. Afr. Mus. Herb. 15783.—Ceres Div.: Warm Bokkeveld, Oct. *Bolus* 2611a; Conical Peak, Dec. *Stokoe* in S. Afr. Mus. Herb. 56807.—Clanwilliam Div.: Cederberg, *Esterhuysen* 7362, *Marloth* 2670; near Crystal Pool, Sept. *Barnes* in Bolus Herb. 23028; Pakhuis, Sept. Oct. *Esterhuysen* 3374, 12064, *Schlechter* (2300 ft. Aug.) 8606; Great Krakadouw Peak, 3000—4000 ft. Oct. *Esterhuysen* 12098; Scorpions Poort, 4000 ft. Oct. *Esterhuysen* 12229; Donkerkloof Kop, 5750 ft. Jan. *Stokoe* in S. Afr. Mus. Herb. 56808; Elands Kloof, *Barker* 3085, *Compton* 9674, *Lewis* (Sept.) in Bolus Herb. 22068; Wabooms River, 3000 ft. Sept. *Compton* 6519; hills between Witte Els Kloof and Lamberts Hoek Berg, stream-side, Oct. *Pillans* 9085.—Malmesbury Div.: Mamre, stream-side, Sept. *Pillans* 9865.—Paarl Div.: Wemmershoek Mts., Tierkloof, Oct. *Wasserfall* 549; Drakenstein Mts., *Stokoe* 6007; Wemmershoek Valley, stream-side, *Esterhuysen* 11442; French Hoek, *Rogers* 17515; French Hock Pass; *Galpin* 12381; Wellington Sneeuwkop, 3500—4000 ft. *Esterhuysen* 12445; Bain's Kloof Area, Baviaans Kloof, Oct. *Leighton* 1348; Slanghoek Mts., foot of Krom River Dome, stream-side, 2000—3000 ft. *Esterhuysen* 11529; Du Toits Kloof, *Esterhuysen* 11513.—Piquetberg Div.: hills near Mouton's Vlei, Nov. *Pillans* 7437.—Stellenbosch Div.: Hottentots Holland, Sept. *Hutchinson* 310; valley north of Somerset West, Oct. *Parker* 3930; Sir Lowry's Pass, Sept. *Hutchinson* 347; Guardian Peak, Oct. *Esterhuysen* 11975.—Van Rhyn's Dorp Div.: Matzikamma, May, *Compton* 7222.—Worcester Div.: Fonteintjiesberg, 5000 ft. Nov. *Esterhuysen* 10968.

SPECIES EXCLUDED FROM BRUNIACEAE.

**Brunia cupressina** *L. Mant.* ii, 343 (1771) = **Diosma cupressina** *L.*

**Brunia floribus solitariis** *L. Hort. Cliff.* 71 (1737); *Wachendorff, Horti ultra* 202 (1747) = **Diosma cupressina** *L.*

**B. foliis oblongis**—*Burm. Rar. Afr. Pl.* 267, tab. 100, fig. 2 (1788) = **Leucadendron Levisanus** *Berg.*

**B. Levisanus** *L. Sp. Pl.* 199 (1753) = **Leucadendron Levisanus** *Berg.*

**B. uniflora** *L. l.c.* = **Diosma cupressina** *L.*

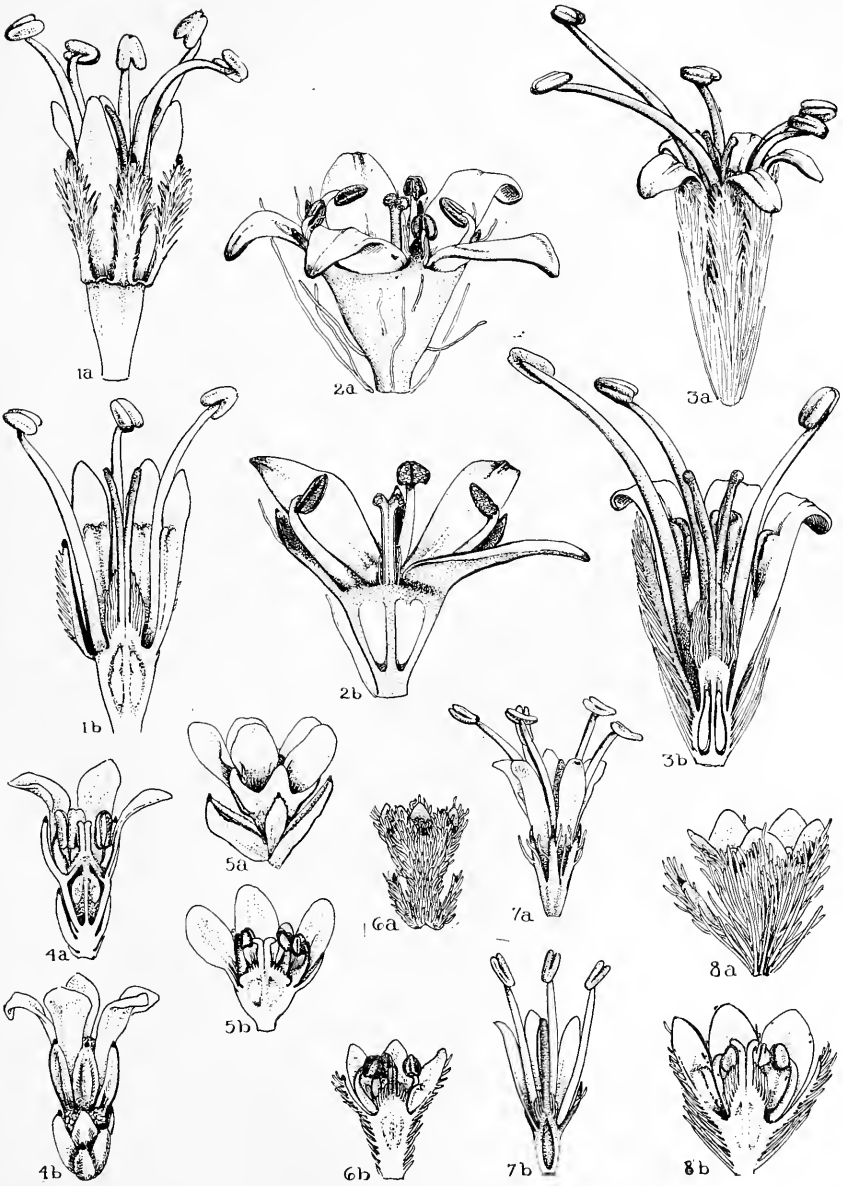
**Linconia peruviana** Lam. Encycl. iii, 527 (1789) = **Rachicallis rupestris** *DC.*

**Lonchostoma quadrifidum** *O. Kze. in Just, Jahresb.* xxvi, 1, p. 343 (1900) = **Campylostachys cernua** *Kunth.*

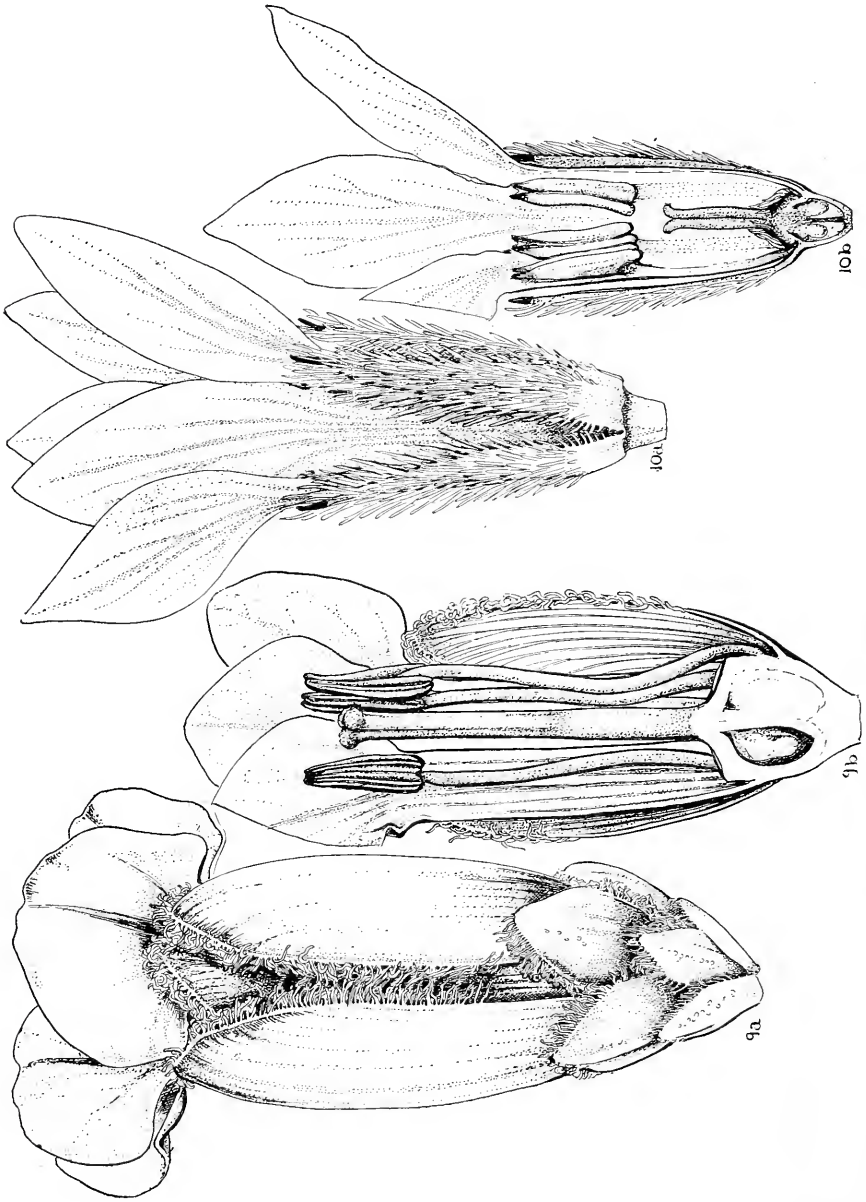
**Ptyxostoma quadrifidum** *O. Kze. Rev. Gen.* iii, part 2, p. 86 (1898) = **Campylostachys cernua** *Kunth.*

**Raspalia angulata** *E. Mey. in Drège, Zwei Pfl. Doc.* 215, nomen (1844) = **Erica modesta** *Salisb.*

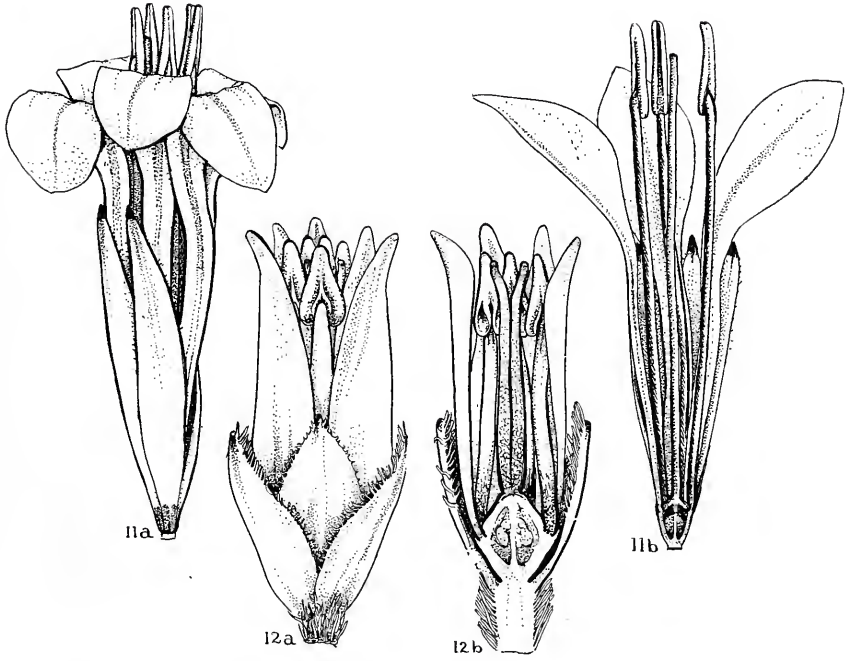
**Tittmannia** *Reichb. Ic. Exot.* i, 26, tab. 38 (1824) = **Lindernia All. sp.** It is an earlier homonym of *Tittmannia* Brongn. (1826). Reasons for conserving Brongniart's genus are given in the Kew Bulletin 1935, p. 519.




1a, 1b. *Nebelia paleacea.* 2a, 2b. *Staavia radiata.* 3a, 3b. *Brunia nodiflora.* 4a, 4b. *Tittmannia laxa.* 5a, 5b. *Pseudobaeckea africana.* 6a, 6b. *Mniothamnea callunoides.* 7a, 7b. *Berzelia lanuginosa.* 8a, 8b. *Raspalia microphylla.* All × 10. *Del.* M. Walgate




9a, 9b. *Audouinia capitata.* 10a, 10b. *Lonchostoma monogynum.* All × 10. *Del.* M. Walgate.




11a, 11b. *Thamnea diosmoides.* 12a, 12b. *Linconia alopecuroidea.* All × 5. *Del.* M. Walgate.

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